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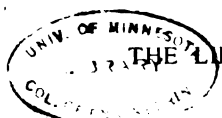
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The Sanitary Engineer:

A

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OF

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AND

Public and Private Hygiene.

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NOTICE.

THE Publisher of THE SANITARY ENGINEER will pay fifteen cents each for a limited number of copies of the issue of July 12, 1883, No. 6, Vol. VIII.

UNHEALTHY WORKROOMS.

VERY few people have any idea of the conditions under which much of the manufacture of ready-made clothing is carried on in our large cities. The great extent of the trade, and the strong competition which exists in it, result on the one hand in the employment of large numbers of women to run the machines and do finishing work of various kinds, and on the other hand in attempts to reduce the cost of their employment in every possible way, not only by paying very small wages, but by crowding them in ill-ventilated rooms, and furnishing the least possible accommodation for them. It is true that this is not always the case, and that there are some employers on a large scale of this kind of labor, who are wise and kind enough to provide large, airy, well-lighted rooms for their workwomen, but some of the sub-contractors and managers of small establishments, to whom may properly be applied the terribly significant name of "sweaters," give little or no consideration to the health of their employees.

It is true that little complaint is made by the latter; even when they are questioned they will be exceedingly careful to say nothing that will seem to reflect on their employer, and it is by no means easy to see how their condition is to be improved. The English Government has tried its hand at legislation on this subject, but the results, as given in a recent number of the London *Lancet*, in the form of a Special Report on the Polish Colony of Jew Tailors in London, are not very encouraging. It seems that owing to the recent exodus from Russia there are now some 30,000 Russo-Polish Jews huddled in colonies in the east end of London, most of them miserably poor, unable to speak English, and almost absolutely dependent on "sweaters" for employment. They are ready to accept starvation wages, and to aid their employers in defying factory acts, sanitary acts, and other acts designed to protect them, but which, with their connivance, are practically, to a great extent, a dead letter. They are, moreover, ignorant of the use of modern sanitary appliances. The *Lancet* reporter refers to one colony of about 150 persons, where some of the rooms are so dark that candles must be used in the middle of the day, and out of fifteen water-closets four were broken and only one clean. "Though provided with a waste-preventer and a flush of nine gallons, the whole system was so foreign to the inhabitants that they had not yet learnt to pull the chain so as to flush and clear the pan." In another colony the closets were so neglected and damaged that they were removed to the yard, the result of which is that the inhabitants instead of going down-stairs simply throw the excreta out of the windows.

We have this same class of people in the tenement-house population of our own cities, notably in New York and Chicago, and their brutal ignorance and liking for filth must be taken into account in all plans for improvement. But where they are willing and able to work at such a trade as tailoring, it certainly ought to be pos-

sible to insist that they shall have enough light and fresh air in their workrooms, and the more so since in the long run this is to the advantage of the employer as well.

Under the most favorable circumstances the trade is not a healthy one, but in crowded rooms, with ceilings only eight or nine feet high, no ventilation, and the air filled with dust and foul organic matters, diseases of the lungs and air-passages disable and destroy the occupants with terrible rapidity and certainty.

THE VALUE OF EXHAUST-STEAM FOR HEATING PURPOSES.

WHEN standing on a tall building in New York City, in the winter time, one cannot help noticing the number of exhaust-pipes from steam-engines which puff their heat and vapor into our atmosphere.

How few of the many who thus view the great city from on high and are driven into a reverie over the thousands of busy people who are beneath, and the industries that these little white puffs are a waste product from, have any idea of the thermal value represented in these apparently useless clouds!

This steam, when it leaves the top of the exhaust-pipe and before it is condensed or dissipated in the atmosphere, represents, we can safely say, three-quarters of the actual value of the coal that was used in the furnace to produce it. Less than one-tenth of the energy of the fluid has been realized in the engine, yet it is all that can be so utilized. What has been used in the engine we may call the static energy of the steam, and what is going to waste in the atmosphere is the potential energy. The static energy is about 1,980,000 foot-pounds per horsepower per hour, but the potential energy, according to the steam used for average engines, is about 30,000,000 foot-pounds for the same time.

It may appear incredible to the business man that a residuum so valuable should be let run to waste if it is possible to utilize it, but nevertheless such is the rule in New York at the present time.

To scientific engineers its value has been long known, and the utilization of exhaust-steam for warming air, etc., has long and successfully been practiced in some industries, and in warming workshops and factories, but its use in large buildings in New York is of comparatively recent date, and very few are as yet using it, or can be induced to try the experiment, because of the prejudice of some of their engineers. There are buildings where its use has not been a practical success, but that was because the arrangements were not planned by a competent person.

In summer time this heat must be wasted, but in winter it should be used for warming and cooking. Many of our buildings as they are now piped cannot use exhaust-steam successfully, but successful methods can be devised by any competent steam-heating engineer, and we hope in a few years to see architects and owners fully educated and alive to the importance of preventing the waste that takes place from the top of our exhaust-pipes.

SEWERAGE IN NEW JERSEY.

WHATEVER shortcomings or failures are to be laid at the doors of the recently adjourned Legislature of the State of New Jersey, it is entitled to

much credit for having enacted a law of great value and excellent provisions in Chapter XXIV., passed March 4, 1884, entitled, "An act to provide for drainage and sewerage in densely populated townships in which there is a public water-supply," which we elsewhere print. While this law is a general one, applicable to any part of the State, there is a distinct flavor of Oranges about it. It is evidently drawn so as to cover the difficulties which have arisen in the way of disposing of the sewage of the territory which lies to the west of the city of Newark, which affords homes to a large number of New York men of business, and which is destined to become densely populated by that class, in consequence of the inducements offered by a beautiful country, public-spirited citizens, and accommodating railroads.

The law gives authority to construct sewers and to raise funds for that purpose, and dispose of the sewage by conveying it to tide-water across contiguous towns or cities, or by deodorizing and consuming it, provided that it shall not be discharged into fresh water, or any stream tributary to a source of water-supply.

It is a very clear, precise, and sound law, and, in view of the recent vagaries of certain State boards of health, it is particularly to be commended, in that it does not require the plans for sewerage to be suggested or approved by any such bodies, but it does require them to be prepared by "competent engineers."

THE IMPORTATION OF LEPROSY.

MAYOR BARTLETT, of San Francisco, has called the attention of the Board of Health to the desirability of preventing lepers from landing in that city, and advised action under the provisions of the Act of Congress passed in 1882. Under this law, if there is found on a vessel arriving from foreign ports any convict, lunatic, idiot, or any person unable to take care of himself, the inspector is to report the facts to the Collector of the Port, and such person is not to be allowed to land. The board has recommended for appointment as special inspector under the provisions of this act, the quarantine officer, Dr. MacAllister, and if this appointment is made the matter is to be tested.

THE victory of the Paterson, N. J., contractors over the City Engineer, in securing from the Street Committee the right to use hydraulic-cement condemned by the engineer, has naturally resulted in the removal of Mr. Hilton, on the expiration of his term of office. The caucus of the members of the Board of Aldermen belonging to the party which is in the majority, and which previously supported Mr. Hilton, concluded that it was inexpedient to nominate a man for City Engineer who could not harmonize with contractors who wanted to do poor work, and they presented the name of another candidate, who was accordingly elected by the board as the City Engineer.

THE substitution of the electric-light for gas in lighting certain portions of this city will result, when the substitution is complete, in rendering some 3,000 gas-lamps useless. The Commissioner of Public Works very properly decided to refuse permission to the several gas companies affected to cut off the lamp service, since it would necessitate tearing up the pavement in the first place, and, if for any reason a return to gas-illumination should be necessary, would also cause a second disturbance of the pavement to replace the service. Several days ago the Manhattan Company, doubtless aware that a permit to open the streets for that purpose would be denied, commenced tearing up the pavement and cutting off the services without the required permits. When the fact became known to the officers of the department, however, the work was summarily stopped.

MAJOR MOSES VEALE, the new Health Officer of Philadelphia, took charge of the office on May 5, he having been appointed to succeed Gen. James Selfridge.

OUR BRITISH CORRESPONDENCE.

Electric-Lighting of the Health Exhibition—Ventilation of the District Railway—Metropolitan Fire Brigade—Improved Quality of Thames Water—Death of Dr. Angus Smith—Fall of Arches at Portsmouth—Association of Municipal and Sanitary Engineers.

LONDON, May 17, 1884.

THE Health Exhibition continues to rise in popular estimation, and now that everything is settling down into order the exhibition has become as interesting as it is instructive. One of its most successful features is the electric-lighting, which is on a larger scale than has ever before been attempted in this country. There are more than 120 miles of wire in use, as against 90 miles in last year's exhibition. The entrance-vestibule, arts-gallery and dining-rooms are lighted with 1,000 incandescent Edison lights each, and in the south gallery there are 1,080 incandescent-lamps of the Swan Company. This gallery appears rather dimly lighted, which is owing, no doubt, to two causes: first, its great length and height; and secondly, its close proximity to the vestibule, which is most brilliantly illuminated. The south central galleries, Central Avenue, and parts of the east and west central galleries are fitted up with 80 Jablochkoff arc-lamps. "Old London" is not yet illuminated, but it is intended to light it with 350 Vincent incandescent-lamps and 5 Mackie arc-lights. The Hammond Company has fitted up the Arcades with 1,000 incandescent-lamps and 40 arc-lights. Other parts of the building are lighted by the Messrs. Crompton, Edmunds, Anglo-American Company, Gülcher Company, etc. Altogether there are upward of 320 arc-lights and nearly 5,000 incandescent-lamps, and there are 62 dynamos. Besides the electric-lights the grounds are brightly illuminated by thousands of Japanese and variegated lamps placed among the trees and shrubs, which give the place a very bright, cheerful appearance.

A compromise has been come to between the Metropolitan Board of Works and the District Railway Company with respect to the ventilators of the company along the line of its route. The full terms of the compromise have not been published, but I understand the Board of Works has agreed to withdraw all opposition to the ventilation, provided the railway company remove such of them as exist along the roadway of the Thames embankment. It is a pity that those in the embankment gardens were not also included, for they are a positive nuisance, and must have a most deleterious effect upon the shrubs and flowers.

During the past year the system of electric fire-alarm circuits has been further extended, and they now form an important feature in the machinery of the Metropolitan Fire Brigade. The total staff of this brigade at present numbers 670 men, 108 of whom are kept on duty during the day, and 253 by night. The rest are available for general work at fires. The number of calls for fires, or supposed fires, during the year, was 2,630. With regard to the fire-alarm circuits above referred to, there are 23 of them now in operation, the number of points at which alarms can be given being 151.

Dr. Frankland, in his monthly report on the Metropolitan water-supply, says that during April the Thames water, delivered by the various Metropolitan water companies, contained, for river water, a very small proportion of organic impurity, and was in this respect much superior to the waters delivered in the preceding months of this year. Have we to thank the Health Exhibition for this increase of purity? It seems like it. At any rate it is a curious coincidence that the water should so much improve just at the time when the exhibition opens.

Sanitary science has, during the past week, sustained a great loss in the death of Dr. Angus Smith, F. R. S., well known for his work on river-pollution.

The recent fall of several arches at the new barracks at Portsmouth only confirms my former remarks with reference to the mistakes which are sometimes made in connection with works under the charge of the royal engineers. It seems almost incredible that buildings of this description which are not being constructed with any great speed, and in fact where time seems to be of no object, should fail in this manner. The whole of the work is being done by convicts, and each gang is, as may be supposed, under far more supervision than ordinary gangs of laborers would be, so that there could be no excuse for scamping labor, and as there is no contractor there could be no reason for using inferior materials. I shall watch with interest the result of

the official inquiry which will no doubt be made into the cause of the catastrophe, and trust that the report of such inquiry will be made public.

The President-elect of the Association of Municipal and Sanitary Engineers for the session of 1884-85 is Mr. W. G. Laws, M. Inst. C. E., the borough engineer of Newcastle-on-Tyne, at which town this year's annual meeting of the association will take place on the 25th of June, when several interesting papers are promised.

SAFETY-VALVE.

STEAM-FITTING AND STEAM-HEATING.

BY "THERMUS."

No. XXXVII.

BOILERS.

(Continued from page 525.)

THE number and size of tubes in a given area of head-sheet and their relative positions have much to do with the steaming qualities of boilers. But withal, it appears reasonable to suppose that the greater the heating-surface of the tubes in a boiler, all other things being the same, the greater the amount of water evaporated will be.

This is so to a certain extent in all boilers, and in special types of boilers where the tubes are in a vertical position and the water that is carried up between them by the force of ebullition is allowed to return again to the lower ends of them by some other course or passage, it may be realized to its fullest extent, as it would be by a mechanical circulation of the water in a boiler properly arranged to allow for an upward movement of the water over all surfaces hot enough to disengage steam. But with horizontal and vertical boilers of the ordinary types it is not so where the tubes are very close or injudiciously placed with regard to each other. For instance, in an ordinary horizontal multi-tubular boiler—the one we have been considering all through—we consider every part of the boiler heating-surface—the under half of the shell, the head-sheets and the tubes. If, now, we consider that we make steam on all these surfaces we are apt also to consider the rise of steam to be in a direction directly upward. If, then, steam rises vertically from every square inch of the boiler surface, the tendency will be for the water to rise with it, both from its own increased heat (decreased density), as well as from the motion imparted to it by the quicker moving bubbles of steam. But we know it is next to impossible to have all the water moving upward at the same time; that water must go down some place, to take the place of what goes up, in spite of the fact that the boiler is heating-surface all over. We may imagine, if you please, that there are innumerable small upward vertical currents of steam and very hot water, and that interspersed between them are as many small vertical descending currents of comparatively colder water; but we cannot imagine this, if steam is disengaged very rapidly, when we consider the ascending and descending currents are in direct conflict, rolling over each other and getting mixed by a whirling process which is not conducive to the rapidity of an onward circulation. But this is not the way currents of circulation act in a steam-boiler when there is much steam made. On a flat, shallow surface, directly over a fire, when steam is first being made, little bubbles rise from the bottom and ascend to the top, with little or no apparent return-current, and they may be likened to so many little shot dropped into a dish of water, excepting that the direction of motion is reversed; the shot finding the bottom because they are heavier than the water, and the bubble of steam finding the top because it is lighter than the water. But should the shot cover the whole surface of the water, or should a large quantity of it be let drop at a particular side of the dish, a commotion will be established in the dish and the water will be drawn down by the shot, and a corresponding quantity will be forced up at some other side or place. In like manner, when there is much steam made and disengaged, where the fire is hottest there an upward current will be formed, which will not be held in check by any disposition of the water to settle back by the force of gravity, and which in its upward rush will force back any minor currents which might have a tendency to rise alongside of it, so that itself may return by that direction. This master-current, in a horizontal boiler externally fired, must be assumed to start where the greatest heat is, or just in front of and over the bridge-wall, and to pass upward between the tubes at that part of the boiler and overflow at the centre and flow toward the ends, beating back and overpowering all antagonistic or upward currents that would exist at the ends furthest

from the fire, as they are only colder by comparison, and have less upward force by lack of intensity and volume. But this principal current goes further. It must force over on what would be upward currents if left to themselves—considering all parts of the boiler heating-surface—and the preponderation is such that the water carried up by the main current goes back in places where the tendency must be to rise, reversing the natural tendency and actually carrying the heated particles there disengaged downward and into the main current at its bottom. It need not be assumed that the water is returning downward at one-half the horizontal section of the boiler, or that sections of the upward and downward currents have to bear any set relation to each other, as presumably they do not, for should the disengagement of steam and the heat be sufficient over three-quarters of the surface of the boiler to force an upward current, the returning water may go back over the other quarter with three times the velocity.

Other and smaller currents also start from the shell of the boiler, some of which may find the surface unopposed, but some of them are drawing into the main current in its upward flight, and the weakest are drawn back and carried along the bottom of the boiler in the direction of the main current.

The diagram, Figs. A, B and C, shows an assumed circulation for a horizontal boiler, with or without tubes or flues. Over the bridge-wall at *d* is undoubtedly the hottest part of the furnace, and here each square foot of the shell represents the greatest efficiency. Here, evidently, the principal current starts and rushes upward. It is pretty safe to assume, then, that at *a*, and against the front head of the boiler, the place that receives the least heat per square foot of surface, there will be a downward circulation, and that one of the return-currents is shown at *a* by the large arrow. This is presumably a very rapid current in its downward section. We may then assume that a large part of the principal current is carried backward from the top in the direction of *b*, but we can hardly consider that it turns downward against the back head-sheet—one of the hottest parts of the boiler—nor very well against the sides of the shell, between *b* and *c*, as the heat here is intense and the surface comparatively large in extent, and we are forced to come to the conclusion that the return-current here must be near the centre of the boiler, as shown in the section, B, while secondary currents are up at the sides on the same section. A secondary current, *c*, can pretty safely be assumed to exist, which rises against the back head, but returns with the main current. The Fig. C is a section at *d*, Fig. A, where presumably the current is upward at all parts of the section.

Of course, much of this is speculation, but it is introduced here to start those who have not considered this question thinking in the right direction, and to show that anything that interferes with the natural and rapid circulation in a boiler, whether a mechanical obstruction or conflicting currents, will lessen the value of a unit of heating-surface.

In horizontal multi-tubular boilers, the tubes themselves, which add so much to the quantity of surface of such a boiler, are the greatest obstruction to the circulation of the water, and by this means lessen the value of the unit of measure the square foot, thereby requiring an average of fifteen square feet of surface per nominal horsepower, where two, three, or five-flue boilers may do the same work with an average of ten square feet. For this reason particular care should be used in the spacing of boiler-tubes. The distance between the tubes in a horizontal position should be all that it is possible to get; the distance between them in a vertical position being of very little importance, so long as there is enough metal in the head-sheets to insure sufficient strength, and which in good practice should not be put at less than three-quarters of an inch.

The square position for the tubes is now more used in horizontal boilers than formerly, and the results seem to warrant the practice. Figure 17 shows the head-sheet of a 48-inch boiler laid out for fifty-two 3-inch tubes, in which two-fifths of the diameter of the boiler is above the tubes for water and steam space. This gives one and one-quarter inches between the tubes in the vertical rows and one inch between the horizontal rows. No tube is nearer the shell than three inches, and by dropping the tubes *a*—dotted lines on each side—it gives forty-eight tubes, and allows an engineer to see the inside of the shell of his boiler sufficiently high up, that by going into the boiler and looking downward, he can see the whole shell and reach it with a scaling-tool. The dotted lines show the range of vision.

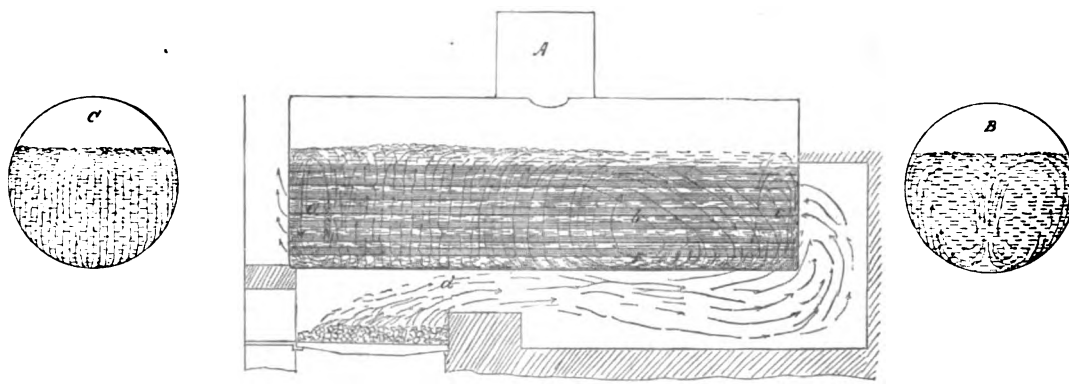


DIAGRAM A, B, C.

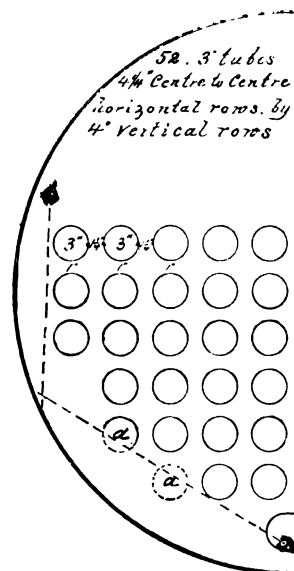


FIG. 17.

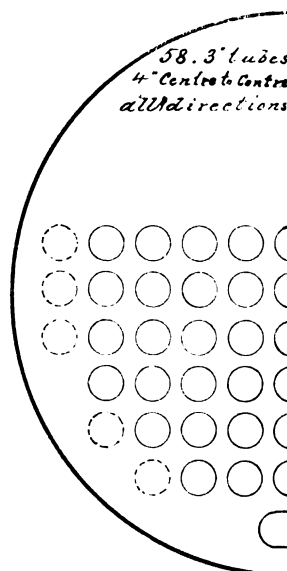


FIG. 18.

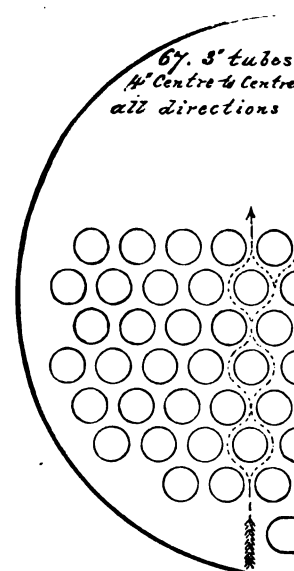


FIG. 19.

Figure 18 shows fifty-eight 3-inch tubes with one inch between the rows of tubes in both directions. This is not considered bad practice, though if we remove the tubes shown by the broken lines, so as to have more than three inches from the sheet and make thorough inspection possible, we are no better than in Fig. 17 with regard to the number of tubes, as we then have but forty-eight. Figures 19 and 20 show the same size boiler-head with sixty-seven 3-inch tubes in each, the distance between any two tubes being the same as in Fig. 18, but the tubes are what is called staggered. Now, it will be noticed that staggered tubes can be in vertical rows in a boiler, or they may be in horizontal rows. If put in horizontal rows, as shown in Fig. 19, as good a result cannot be expected from them as when they are placed in vertical rows, as shown in Fig. 20, although the surface is the same. In Fig. 19, the rush of water and steam up between the tubes is retarded much more than it can be in Fig. 20, and in like manner the return circulation is held back by the increased friction, and it is not hard to imagine a condition of things where the return-water comes back late, and does not form proper contact with the bottom of the shell, except spasmodically to the increased danger of surrounding objects and the shortening of the life of the boiler, not considering priming and other kindred evils. In Fig. 20, with a distance between the tubes of one-third of their diameter, it is possible to get a straight course between the tubes, as shown by the straight arrow, but in Fig. 19 this is out of the question, and the current passing between any two tubes is forced to divide on the next one.

If one is forced to put so many tubes in a boiler that he cannot put them in a square form, as that shown by Figs. 17 and 18, let him put them in as shown by Fig. 20, regardless of the apparent unevenness of the top row. The tubes are closer to the shell for equal numbers in the case of Fig. 20 than in Fig. 19, due to the room lost by keeping below the two-fifths line with the upper row; but by encroaching on the two-fifths line one-half the diameter of a tube, the general result will be equal.

(TO BE CONTINUED.)

PLUMBING MATTERS IN BROOKLYN.

COMMISSIONER RAYMOND, of the Health Department of Brooklyn, has amended the plumbing regulations in regard to overflow-pipes from fixtures, ruling that the overflow-pipe must join the inlet-pipe to the trap, instead of entering

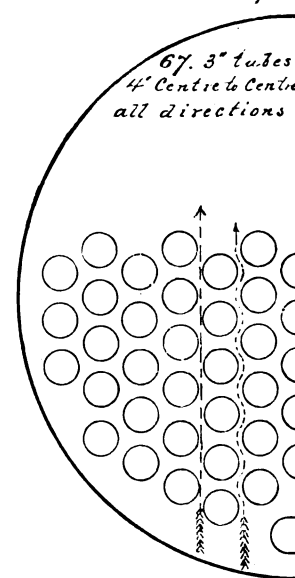


FIG. 20.

the body of the trap, in the case of "bottle" and kindred traps. The reason for this is that Mr. James Powers, the Chief Inspector, reports that in many cases the overflow-pipes are jointed into the bulb of the traps so high as to make a trap abortive, or at best to give it very little seal; a case in point being the recent discovery of such a trap by Assistant-Inspector Moffat, in which the seal was only $\frac{3}{8}$ of an inch deep when the bulb was at its fullest with water.

The Commissioner is also preparing to classify and number all the houses plumbed under the Act of 1881, which is entitled, "An act to secure the Registration of Plumbers and the Supervision of Plumbing and Drainage in the Cities of New York and Brooklyn;" and keep a record of the rate of mortality in these houses as compared with the death-rate in houses fitted previous to the passage of the act.

THE Sanitary Assurance Association of London has resolved that "certificates be given to builders and plumbers who, having executed sanitary works under the direction and supervision of the association, have completed the same to the satisfaction of the Medical Officer and the Sanitary Surveyor."

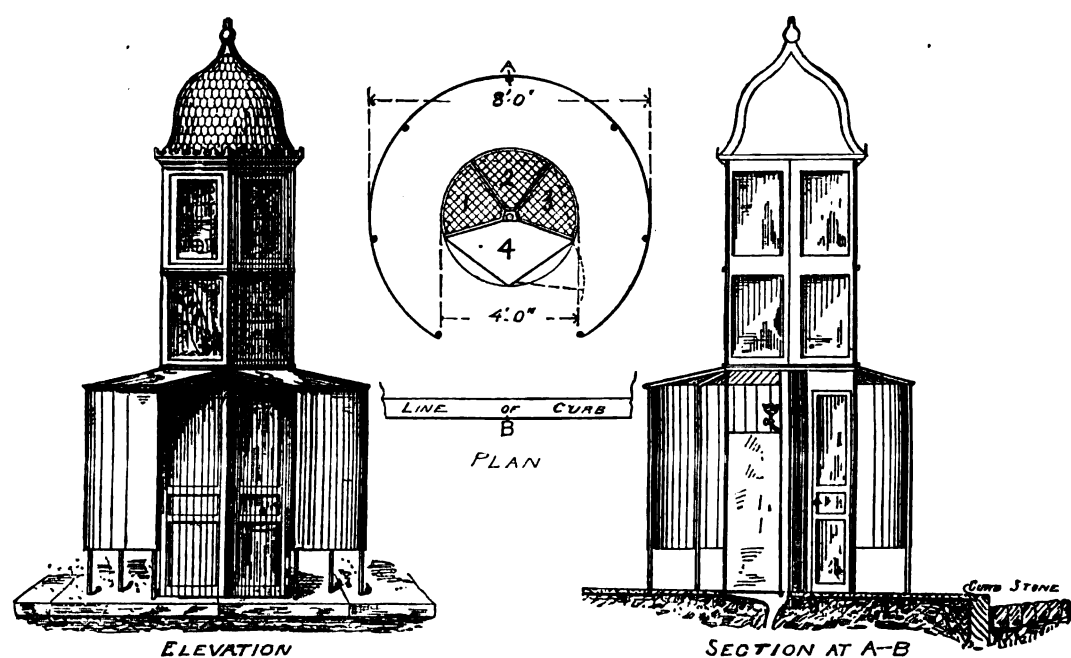


FIGURE 4. THREE-STALL TOWER.

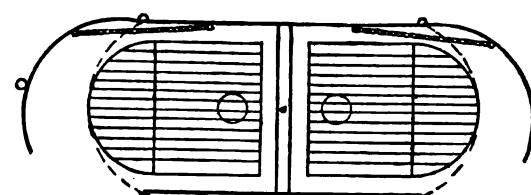


FIGURE 3. PLAN WITH TWO STALLS.

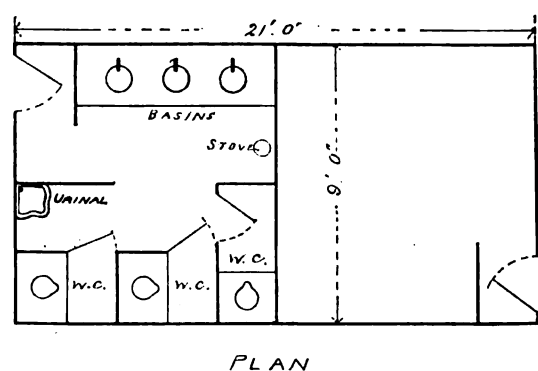


FIGURE 6. STALLS IN LONDON.

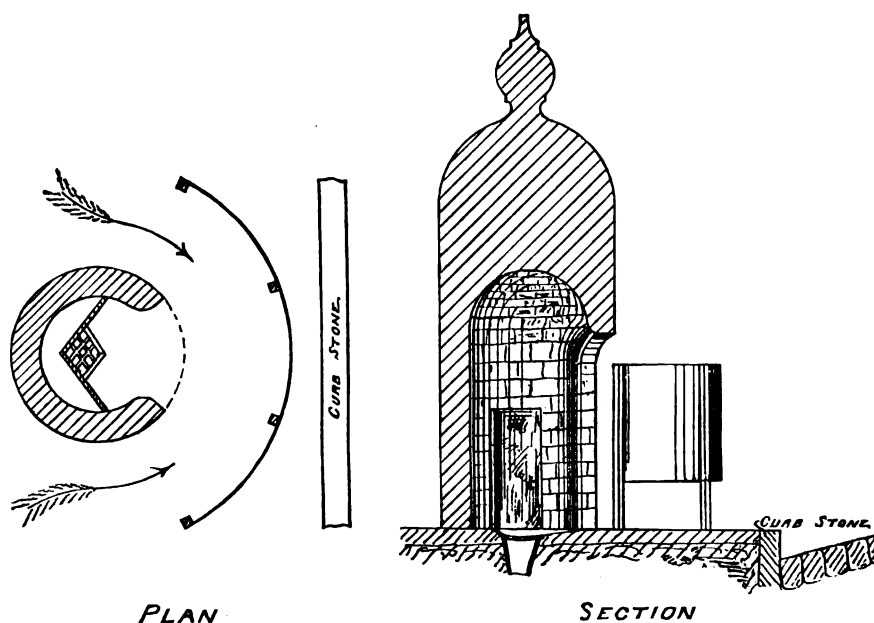


FIGURE 2. SINGLE-STALL TOWER.

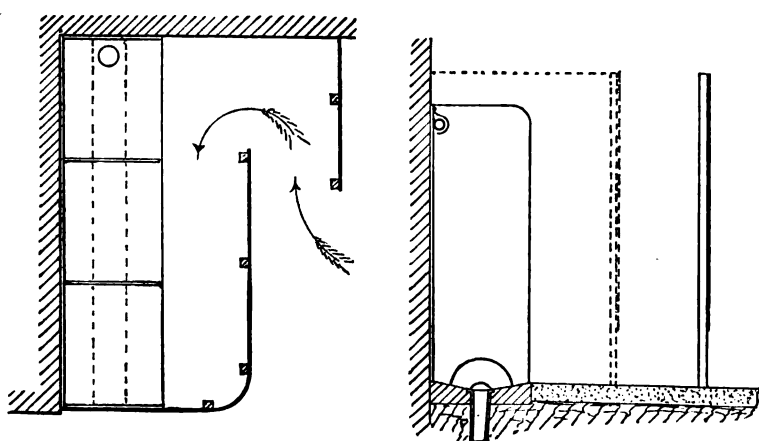


FIGURE 1. WALL STALLS.

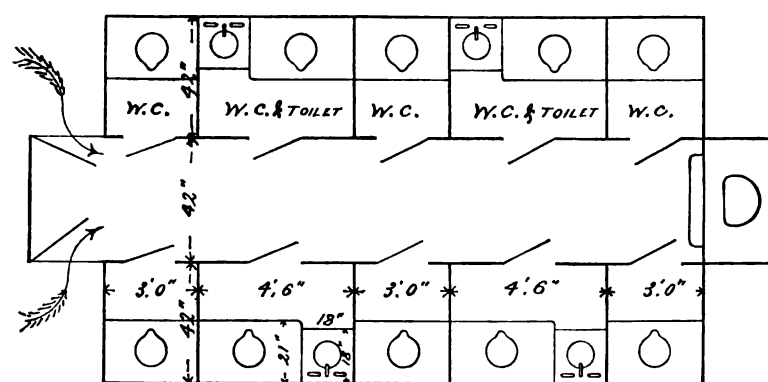


FIGURE 5. STALLS OF THE COMPAGNIE DES CHALET'S DE NECESSITÉ.

PUBLIC URINALS IN PARIS.

PARIS, April 30, 1884.

To the Editor of THE SANITARY ENGINEER:

WHEN one has been accustomed to live abroad for many years and comes back to America, there are some things which are much missed among all our so-called conveniences. Not the least among these are the public urinals and conveniences which are so profusely distributed around Paris and other Continental cities, and which are so prominent by their absence in America, or at least in Eastern cities. To be sure, in New York and Boston on some of the public parks or squares there are one or two "sanitariums," but their arrangement and condition are more a crying shame to sanitary science and knowledge of the day than they are useful or ornamental. Especially in warm weather the effluvia in the neighborhood of them is often quite oppressive.

Being a constant reader of THE SANITARY ENGINEER, I have thought that possibly some of your readers interested in town or city works might be interested in a description of the appliances used in Paris. That is why I inclose the following description and sketches.

Although, generally speaking, Paris is not the place to pick out models of sanitary plumbing, yet, as far as public conveniences are concerned, it is far ahead of our own cities. To be sure, many hotels and railroad stations with us have elaborate lavatories, etc., which are freely used by the public, still they are only in certain sections of the city, and every one does not always feel like relying entirely on them.

In Paris, all the large squares and places, and wide streets are supplied with public urinals, placed more or less closely together, according to the traffic in their neighborhood. Years ago these were offensive to the eye at least,

if not to the olfactory nerves, but with rare exceptions those of to-day are entirely screened and well cared for. There have been many different styles, but gradually they have been reduced to three or four standard types:

First—Those placed against walls or buildings. To-day these are generally formed of slate slabs and partitions, supplied with a sheet of running water, and a gully at the ground-level with outlet and strainer. They are protected by a sheet-iron screen running up about six feet and starting about fifteen inches from the ground; this permits of a certain supervision and prevents nuisances. See Fig. 1.

Years ago no screens were to be seen anywhere, but gradually they have been adopted in almost every case, unless in the outlying districts.

In many places isolated stalls similar to these are set up in a double row each side of a middle division, and surrounded by screens and sometimes by shrubbery in addition.

Second—Those set on the edges of sidewalks or in squares, etc.

The old form for these was a simple masonry tower about ten or twelve feet high, hollowed out at the bottom on the street side, and finished off inside with two vertical cement surfaces at an angle of about sixty degrees. These surfaces ran up about four feet and were generally wetted down by a spray nozzle; at the bottom the outlet had a plain iron grating. The outside of the tower was used for posters or printed advertisements. Many of these are to be found in the provincial towns, and on the docks in Havre, Rouen, etc. Those in Paris are now furnished with screens about four feet high. See Fig. 2.

Later a style with two stalls was much used, both with and without doors. They are mostly of cast-iron. The upper part is glazed and lighted by one gas-burner at night. Many of these are now in use on the outer boulevards and the Monceaux quarter, etc. In the excentric quarters the doors, which are of cast-iron, are frequently broken off, either purposely or by being swung too hard; they are prevented from being swung too far back by a chain. They are set on a stone base, which is hollowed out and has a grating over the whole area of each stall. See Fig. 3.

The more recent style has three stalls, as in Fig. 4. It is a light frame pentagonal building, similar to the hexagon one used for news-stands on all the boulevards. The upper part is utilized for advertisements, which bring in quite an income. Three-fifths of the lower part forms the urinals and the other two-fifths forms a closet for brooms, etc., for the sweeper, or "cantonnier," whose duty it is to look after them. The advertisements are stuck on plates of glass and changed around in different quarters. At night they are lighted up.

For years public water-closets have existed in the numerous passages and in the large parks and gardens of Paris, in charge of a woman, whose business it was to keep them in order and collect the fares, varying from three to five cents. Usually a lavatory was also attached, but within the last four years the "Compagnie des Châlets de Nécessité" has obtained the right to put up buildings for this purpose in all the squares and large thoroughfares of the city. In some of the gardens or squares there are separate buildings for the sexes, in which case each contains four compartments, but usually they are all in one building, one side being assigned to each sex, and one person in charge of the whole. The buildings are of iron and glass, finished inside in marble, with tile floors, well lighted and ventilated, and present a very neat appearance. They are about 18' x 11', with projecting porch at each end, and consist of a common passageway down the centre and five closets on each side, three being plain closets, for which a charge of one cent is made, the two others being toilet-closets, having fixed wash-bowl and roller-towel; these are charged two cents. Each door has an automatic lock, which has a counter attached to keep a check on the accounts.

The partitions between the closets are marble and 7½ feet high. The inside partition is of wood, of the same height, doors 6½' x 2'. On the outer walls the marble goes up about 6½ feet, the upper part being glazed. The porch at one end is usually closed and has a seat and desk for the person in charge. The seats are in waxed oak; closets of the pan pattern. See Fig. 5.

The company which owns the Châlets de Nécessité, as they are called, has a concession from the city for thirty years, at the end of which time all the buildings, etc., revert to the city. The company pays an annual ground rent to the city of 20,000 francs. At the present time there are 106 of these buildings, some with four closets, most of them with ten closets. The receipts from each building vary from about twenty-five to thirty-two francs per day. There are, besides, some receipts from advertisement space let on the outside of buildings. The expenses include janitors, gas and water bills, removing soil, repairs, etc.

A few buildings similar to these have been erected in some of the large streets in London (Ludgate Circus), the principle difference being that each sex is entirely separated, each having one-half of the building, which necessitates two attendants, but is considered necessary from a sense of propriety. The inside is all finished in wood and shellac and is not nearly as well ventilated or lighted as the Paris ones. There is a small gas-stove for heating water when required. The charge is one penny for each requisite: water-closet, basin, hot water, keeping parcels, etc. Here there is no pan or valve to the closet; each is furnished with a waste-preventing tank and pull. See Fig. 6.

Why do not some of our cities establish some such conveniences? Kept properly, there is no reason why a very slight charge could not be made to give good returns.

Y. N. S.

VENTILATION OF PUBLIC BUILDINGS.

THE following description of the arrangements for ventilation in some large public buildings is taken from a paper by Arthur Walmisley, A. K. C., read at a recent meeting of the Civil and Mechanical Engineers' Society, and published in the *Building News* of April 18, 1884:

"The apparatus for the ventilation and warming of the Royal Albert Hall, at Kensington, was designed by Mr. W. Phipson, and carried out by him under the direction of Major-General Scott, the architect to the building. The form of the hall is nearly a true ellipse in plan; the span of the roof is 219' 4" x 185' 4", and the span of the outer walls is 272' x 238'. The arena is 15 feet below the level of the Kensington roadway, and the height from the arena to the springing line of the roof is about 135 feet, and to the top of the lantern surmounting the roof about 150 feet. Two air-shafts are provided, having their apertures at some distance from the hall, and the air in passing through them is strained by fine sieves and washed by means of water-sprays; it is then driven into the main air-chambers by means of two fans, each 6 feet in diameter, fixed at the orchestra end of the hall, and worked by two direct-action steam-engines of seven horse-power. Each of these fans has four blades, and they are together capable of forcing 3,500,000 cubic feet of fresh air per hour into the building. These main air-chambers are placed, one under the arena, another under the amphitheatre stalls, a third under the main corridors, and contain about 26,000 square feet of heating-pipes about 4 inches in diameter, by means of which the air may be warmed in winter to the required degree prior to its conduction, by means of air-flues into every part of the building. By an arrangement of valves a direct supply of fresh air may be distributed into the hall without its having to pass through the various heating-chambers. Perforations are provided in the arena floor, in the risers of the amphitheatre stalls, and by vertical air-flues formed in the walls with apertures on each floor for its circulation throughout the hall, and its escape is provided for in the centre of the roof by a shaft which is carried some feet above the highest part of the roof, in which the current is maintained by the use of about 1,260 gas-jets. From the experience obtained in the working of this apparatus it is found that a temperature of 56° to 58° Fahr. can be easily maintained during the winter months within the hall. The heating-surface in the three continuous heating-chambers is arranged in distinct coils, the circulation of water throughout the same being produced by the condensation of steam in the several heaters provided for working each set of coils, the steam being supplied to them from two 30 horse-power boilers.

The ventilation of the New Law Courts, London, has been designed and executed by Messrs. Haden & Sons. In the basement there are six boilers of 50 horse-power, each 22 feet long by 7 feet in diameter. Four of those are hot-water boilers, and two are steam-boilers. Only one steam-boiler and two hot-water boilers are worked at one time, the alternate boilers serving as duplicates in case of necessity. There are eight small engines, each about 6 horse-power, worked by the steam-boiler, which act upon 16 fans. Thus two fans, each having a disk of about 3 feet diameter, are revolved by one engine.

At the top of the roof is a tank, in connection with which a small pumping-engine feeds the boilers. These boilers are of Galloway tubular pattern, each containing twenty-eight tubes. The fresh air, before being admitted to the fans, is washed by passing through a spray of water, which clears it of all soot and dirt. In the summer the water supplying the spray is made to pass first through a refrigerator in its passage from the tank, so as to cool the air to (say) 35°. After leaving the fans the air travels into a compartment whence it can be caused to enter either of two chambers, one containing heating-apparatus, so that the air may be warmed or not, as desired, before entering the courts; thus the atmosphere of each court may be maintained at a temperature agreeable to the presiding judge. The air finally passes through very fine gauze underneath the floor of each court, and then is diffused through apertures in the risers of the steps to the seats. There are eight shafts for the extraction of the vitiated air, the exhaust in summer being aided by special steam coils formed of 2-inch diameter pipes in union with the steam boilers. There are two arterial lines of pipes, 6 inches diameter, at a high and low level throughout the building, with branch pipes in the corridors and rooms to be warmed, all in connection with the hot-water boilers. The scheme is so laid out that it is impossible for absolutely cold air to enter the courts in the winter season, and the air is heated to the required degree by hot water, not by steam. The walls are free from any signs of condensation, and the average temperature maintained varies from 60° to 74° Fahr. The air is renewed completely, without sense of draught, three times in the hour. The complaints recently raised against the ventilation of the Law Courts have arisen solely from the absence of felt under the slates of the roof in the courts complained about; but now these structural defects have been remedied and the roof rendered air-tight, no cold draughts are experienced. In December, 1877, Mr. R. E. Villiers took out a patent for the system of sliding roof, which he had erected the previous year at the Canterbury Music Hall, in the Westminster Bridge Road, where a roof 36 feet long by 18 feet wide is made to

slide laterally over girders fixed outside the remaining side portions of the roof, leaving the central space free, when the weather permits, for the ascent of hot vitiated air, and thus speedily and effectually clearing the building. This system of freeing closed places is to be recommended for buildings where a great number of persons are accustomed to assemble or congregate, and especially for such places as music halls, or where smoking is allowed. The constant upward and outward passage of the heated air prevents any excess of down draught until the building is cleared of all vitiated air. The sliding roof travels on wheels clogged to run on a cogged rail, and is moved by means of a beveled gearing worked by a cranked handle. In the case of fire the firemen can apply the hose from the opening in the roof to any part required.

This idea has also been carried out in the roof of the Circus, at Paris, on a much larger scale. The hall of the Circus at Paris forms a large oval, 341 feet long by 223 feet wide. The arena is surrounded by a row of steps 33 feet over all, leaving a central space 275 feet long by 157 feet wide. Originally the steps alone were roofed over by a timber construction, but in 1877 the whole thereof was removed and a light iron roofing substituted, together with a sliding cover of iron and glass over the arena, designed by M. Lantrac, the engineer to the company. So admirable is the arrangement that a description of the construction may not be out of place on the present occasion.

Immediately within the steps surrounding the arena the roof is formed in an iron belt 50 feet wide, leaving a central space of 175' x 57'. It is this central space which can be left open to the sky for the freedom of vitiated air, or closed at will by the aid of a special movable covering. This movable covering is divided into two parts, each of which can be moved on one side longitudinally over fixed outside roofings by traveling on wheels worked by mechanical power, and thus, when open, both halves of the central portion completely disappear from the audience inside the hall. The fixed covering springs at a height of 52 feet above the ground, and abuts against an oval centre 72 feet above the ground. It is supported at its circumference by twenty columns, and at the summit rests against central beams which form the circumference of the movable roof. Each movable half weighs 24½ tons. The beams forming the boundary of the movable portions, when closed, are prolonged longitudinally, and are supported by four pillars 72 feet high, for the purpose of supporting the movable portion when open. Between the roofing over the steps and the fixed belt surrounding the arena there is a vertical space 16 feet in height, closed by glass windows, and the curved parts at the two extremities of the oval are continued round without the introduction of any special polygonal framework.

The system adopted for the opening and closing of the revolving dome in the Royal Observatory of Vienna, although designed for the great 27-inch refracting telescope used in that observatory, is worthy of mention on the present occasion as suitable for adoption for large roofs of this shape, where the covering is required to be opened and closed for the purposes of ventilation. It was designed by Mr. F. Fillner, Architect, and Mr. Howard Grubb, Honorary Master of Engineering in the University of Dublin."

A CURIOUS story comes from Georgia of a Col. Fort in Dougherty County, who has an artesian-well which furnishes excellent water, and two hundred feet from it has drilled a hole about eighty feet deep in a pond of stagnant and brackish water, the last fifty feet being through rock. Through this hole the pond-water flows away rapidly, relieving the plantation of a pestilent nuisance and making available about two thousand tons of rich muck available for compost.

We should be glad to hear fuller particulars of this double-action phenomenon.

THE Tyne Port Sanitary Authority has given to a *Lancet* correspondent some interesting particulars about the inspection of vessels at that port. During February and March inspections were made as follows: British steamers, 963; British sailing-vessels, 704; foreign steamers, 232; foreign sailing-vessels, 181. Including small craft, altogether 2,162 inspections had been made. Of these sixty-three were found in an insanitary condition in their crew spaces, holds, closets, etc. It is, however, satisfactory to note that when notices were given to remedy these defects, they were, with one exception, satisfactorily complied with. The foreign steamers were often overcrowded with emigrants, and the accommodation defective, but vessels under foreign flags, as long as they do not cause any nuisance to the British public, cannot be interfered with.

It is reported that the stench from old box-sewers caused Public School No. 3 in Hoboken, N. J., to be closed lately.

CERTAIN parties in Jersey City make it a business to buy the straw bedding from the emigrant quarters of steamships, which they pretend to renovate and sell for the manufacture of paper. This is in violation of the rules of the local board of health, which has recently caused the arrest of six of the men in the business.

Correspondence.

CONEY ISLAND SEWERAGE.

SACO, ME., May 14, 1884.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR: Will you please inform me (if you can do so) whether the Brighton Hotel at Coney Island has adopted any scheme for disposing of its sewage other than the cess-pool arrangement of three years ago?

Also, if the Manhattan Company experiences any difficulty with "Powers' Disinfecting Tank" which they were to put in about three years ago? I have seen nothing about either.

Very truly yours,

W. S. DENNETT.

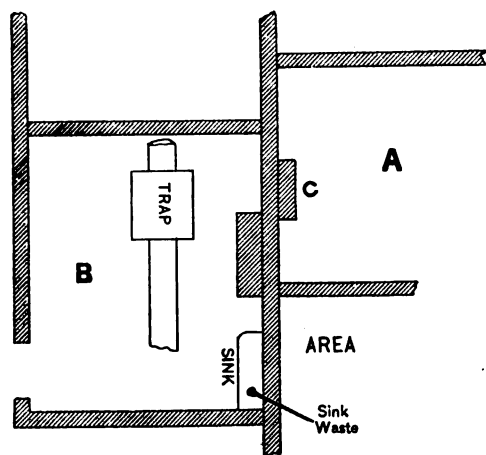
[We are informed that there has been no change in the disposal of sewage of either of these hotels within the time you mention except what was made by the action of the sea during the winter. The arrangement at the Manhattan Company's premises was partly washed away, and is being restored by Mr. Powers to its original condition.]

BAD DRAINAGE OF LONDON HOUSES.

LONDON, May 8, 1884.

To the Editor of THE SANITARY ENGINEER:

I HAVE lately been engaged to discover the cause of a smell in basement of A; the smell was so bad at times that the occupants could not remain in the room; the flooring was taken up and examination made, in the hope of discovering some disused drain or cesspool. This examination led to nothing, there being no drainage at this point of the premises; in fact, there was no drain inside the house at all, the subsoil being gravel, or ballast, as it is termed in London. I concluded the smell came from the next house, and upon going in there, I was met with the usual reply, that there was nothing there and never had been, and was, in fact, nearly ordered out. I then communicated with the agent of the property, who gave permission to open up in B, and about two feet deep in the centre of the room was found an old brick intercepting-trap and drain



of about two feet diameter, running right and left. The drain was fairly clean, but the trap was full, and its capacity may be guessed when I mention that we carted away two one horse loads from it.

This was an old drain that previously did duty for the whole block and had run into cesspools. Upon the houses being connected with the public sewers the cesspools had been filled in, but the accumulation that was in the trap was left there. The bottom of the trap was merely bricks laid on the earth, without any cement or mortar, and the soil being gravel was porous, so that in wet weather it turned partly into a liquid state, and our clients having a fire at C, and the foundations being shallow, the smell passed into their room and they were fairly driven out; in dry weather, and when there was no fire at C, they were comparatively free from smells.

To show no reliance can be placed upon statements made by people situated the same as in B, I will briefly state the facts: B was part of a large mansion let out in chambers, and in B was a hall-keeper; the only place he had for himself, wife and five children to live and sleep in was this one room. There was a sink in the corner, and to remedy the smell—that there was one was freely acknowledged after this—the sink had been drained and re-drained, and though the hall-keeper had lost a wife, and the children were never well, he had preferred to put up with the smell rather than have the place again upset. Yours, etc., W. SAWYER.

SINGLE-PIPE SYSTEMS.

SPRINGFIELD, MASS., May 23, 1884.

To the Editor of THE SANITARY ENGINEER:

In conversation with a gentleman here to-day, I learned that he had been making some experiments in steam-heating, and that formerly he had always used steam-mains and return-mains, and of course steam and return-risers. Some time ago he abandoned this practice for the single-pipe system, with return-main, but no return-risers. He now uses the single-main and single-risers only, and says that he has come to the conclusion that reliefs and return-mains are all a mistake, and that the only perfect system of gravity house-heating is by a single main, and risers made amply large, and pipes pitched so that condensation returns along the bottom of the main to the boiler.

Thinking that this might be of interest to you, and having often seen this system condemned in your valuable paper, I take the liberty of laying the matter before you.

Very respectfully,

QUICKSAND.

[We are not aware that we condemned the system unqualifiedly. With pipes sufficiently large to allow the water of condensation to run back along the bottom of them in a proper manner and under all conditions while steam is passing out over the water, it will work, with certain drawbacks. But the dictum that "reliefs and returns are all wrong, and that this is the only perfect system," reminds us of the quack pill-doctor who prescribes his pills for all ills that flesh is heir to.

In a small building the system may be carried out in a fairly successful manner when the conditions are all right. But who with any experience would think of using the system with mains several hundred feet long in cellars eight or nine feet high, with ramifications in all directions, and the condensation say from 20,000 square feet of surface, trying to run down the throttle-valve against the steam rushing out? Or, who that has had experience with large apparatus would want to turn on steam in such an apparatus, had it been shut off an hour previous? Imagine yourself (if you are a steam-fitter) taking hold of the throttle-valve, knowing the main-pipe to be half full of condensed water for half its length, which water formed and ran there when the steam that you imprisoned in the radiators and pipes had condensed.

But the standing objection to the one-pipe system, with or without return mains, and which applies to large and small work alike, is: If you have a leaky valve on a radiator (which is the rule when the job is a few years old), or if the valve is improperly closed (which is also the rule), steam will pass into the radiator through a small opening, but the water will not run out again, and the consequence is the heater will fill with water. Upon opening the valve it is clear the water must run out before the steam can pass in, and the result is that the water, dropping down the pipe, will condense the steam, and the water-hammer and noise follow. When the radiator is only partly filled with water, the steam forces its way into the radiator, where it is rapidly and intermittently condensed, with the racket and rumble so familiar to some apparatus, and which will not cease until the water is as hot as the steam.

There are other systems which also make noise, and have their good points as well as their defects, and with this knowledge before us we never take it upon ourselves to set any system outside the pale of intelligent practice.]

WATER-SUPPLY FOR ISOLATED BUILDINGS.

In a paper on Water-Supply to Isolated Buildings, read before the Architectural Association in London, an abstract of which is printed in *Building News*, Mr. W. E. Rich states that the Earl of Kenmare's new house at Killarney had been supplied from springs about a mile and three-quarters distant. They yielded about 15,000 gallons per day, and the water was conveyed to a covered reservoir holding 30,000 gallons, situated at an elevation of 110 feet above the house floor, in a 4-inch cast-iron pipe, which bifurcated into fire-mains and service-pipes for drawing water direct all over the establishment. A similar system had been adopted by the author at Admiral Egerton's house on St. George's Hill, near Weybridge. The aim should be to provide a large main from the reservoir to the house, and to draw all water direct from this main, abolishing all subsidiary tanks and cisterns. When the supply was scanty and the site elevated, material dependence had to be placed on the rain-water gathered from the roofs in large storage-reservoirs, and in the west of England the rainfall on the roofs of ordinary agricultural cottages would suffice for all requirements of the inmates if a moderate capacity of storage-reservoir were provided. For large establishments so situated an artificial gathering-ground was preferable. At Sir Greville Smyth's residence, Ashton Court, near Bristol,

a half-acre plot of sloping ground, near the summit of a hill behind the house, was covered with a floor of impervious concrete, and had surface-gutters on it for conveying any water falling on it to a 40,000-gallons covered reservoir below. For every inch depth of rainfall upon such an area of concrete about 8,000 to 10,000 gallons of water should be delivered into the reservoir.

For the construction of reservoirs the rule laid down should be that the larger and the more imperishable the materials the better. Brick laid in cement was preferable to metal, which required constant painting and maintenance. They should be kept out of the house, and where the elevation of surrounding country permitted they should be constructed partly underground. They should be covered in with a 4½-inch or 9-inch brick vault, according to size, and this again protected by a coating of from 12 inches to 18 inches of earth to equalize the temperature. Circular tanks were preferable to square ones. As to mains, the pipe to house should be larger than that from pump to reservoir. The service should be constant, without any tank in house, except for hot water, as every receptacle was a source of contamination, and wherever a branch was inserted a cock should be placed.

Passing on to consider means of fire extinction, Mr. Rich recommended the use of hydrants outside and fire-cocks with portable hose within the house, supplied from the common main. At Worcester Cathedral the mass of dry woodwork in the central tower, far above the city-supply levels, had been a source of anxiety to the authorities, and he had arranged tanks high up in the tower, with hydrants on every floor, and a rose arrangement, with also cocks in the crypt, where the engine supplying the power was placed. In the event of an alarm of fire, a verger going into the crypt could at once discharge a shower of water upon the bell-beams, floors, and other woodwork in the tower.

PLUMBING RULES RECOMMENDED FOR HARTFORD, CONN.

THE City Medical Society, of Hartford, Conn., has addressed resolutions to the Court of Common Council of that city, recommending the adoption of an ordinance regulating the plumbing and ventilation of buildings, and the establishment of a regularly organized city board of health. The preamble and first resolution, in which the society define the necessity and the character of such legislation, we quote in full:

"WHEREAS, There has of late been a large increase in the death-rate of this city, and an unusual amount of sickness from diseases which we believe and which are generally agreed to depend upon insanitary influences; and

"WHEREAS, We believe the epidemic of diphtheria to be largely due to these insanitary influences, either within or without the dwellings, many stating in the course of the discussion that they had traced every case that had come under their treatment to defective plumbing of the houses in which the cases occurred, so that the atmosphere was polluted by the gases of decay; therefore, in view of these facts, and of the results of our experience generally in tracing the causes of disease, it is hereby

"Resolved, That in our opinion no building should be allowed to be constructed for occupation as a dwelling, unless it conform to the minimum standard, at least, generally accepted by sanitary engineers as essential for a human habitation; also, that this standard should be established by an ordinance, and secured by inspection of the building during the process of its construction, and that this should be established also as the standard for the Board of Health whenever a complaint is made that a building is in a condition detrimental to the health of the inmates."

PHILADELPHIA PLUMBING ORDINANCE.

THE ordinance regulating the registration of the plumbers of the city of Philadelphia is still in the hands of the sub-committee, to which it was referred by the Sewer Committee of the Common Council.

SEWAGE-IRRIGATION AT DANZIG.

THE sewage-irrigation at Danzig was undertaken as a private enterprise by the firm of Alexander Aird, the city giving the rent of the sewage-farm and the control of the sewage for a certain number of years. The contract terminated on the first of April of the present year, at which time the city was to assume the management of the pumping station and of the irrigation fields. Although the pecuniary success of the Danzig enterprise has been emphasized by the advocates of this method of disposing of town sewage, it appears that the authorities were in no haste to assume the expenses and enjoy the profits. They have, in fact, concluded a new and, as they consider it, a very advantageous contract with Mr. Aird for a period of five

years. The contractor bears all the current expenses, but the city pays for repairs and renewals of machinery which exceed the amount of 100 marks, and, moreover, pays the contractor an annual subsidy of 10,000 marks (say \$2,400).

THE NEW JERSEY DRAINAGE AND SEWER-AGE LAW.

THE following is the text of the law passed by the New Jersey Legislature at its last session, to provide for the drainage and sewerage of densely populated townships in which there is a public water-supply:

1. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That in any township in this State in which the population has become, or shall hereafter become, so dense as to average not less than 2,000 inhabitants to the square mile of territorial area contained in such township, and in which a supply of water for public and domestic use is furnished, or shall be furnished, from water-works, it shall be lawful for the township committee to provide for, obtain, and cause to be constructed a system of sewerage, or of drainage, or both.

2. *And be it enacted*, That it shall be lawful for the township committee of such township to cause to be made surveys, plans, and estimates by competent engineers and mechanics, sufficient to demonstrate a practicable and efficient system of sewerage and drainage for such township, including the disposition of house-sewage and waste.

3. *And be it enacted*, That it shall be lawful for the township committee of such township, whenever in their opinion the public good demands it, by ordinance, to cause sewers and drains to be constructed in any part of such township, and if necessary, to take and appropriate for the purpose of constructing such drains and sewers, any lands and real-estate, upon making compensation to the owner or owners thereof, as is hereinafter mentioned and provided.

4. *And be it enacted*, That in case the said township committee shall deem it advisable, in order to the efficient sewerage or drainage of such township, to build and construct a sewer or sewers to tide-water, and for this purpose to pass through territory situated within the bounds of any other municipal corporation or corporations, it shall be lawful for such township committee to build and construct such sewer or sewers to tide-water, and to take and appropriate for this purpose any lands and real-estate, and to lay down, examine, repair and replace such sewer or sewers in, through, or across any public street or highway, upon making compensation to the owner or owners thereof, as is hereinafter mentioned and provided.

5. *And be it enacted*, That in case the township committee shall deem it expedient to contract and agree with the municipal authorities of any city whose territory adjoins that of such township, for the privilege and right to connect the sewers and drains of such township with those of such adjacent city in such manner that the sewage and drainage of such township or city shall flow into and through the sewer or sewers of said city or township, it shall be lawful for the township committee of such township, and for the common council or other governing body of such adjacent city, to enter into and make a contract and agreement in writing in behalf of the municipal corporations which they represent, for the right and privilege aforesaid, upon such terms, and for such consideration, and during such period as may be settled upon and determined by and between the said township committee and the said common council, and any such contract duly made and ratified by such township committee and such common council shall be the valid contract of such township and of such city during the period, and according to the stipulations therein expressed.

6. *And be it enacted*, That in case the township committee of such township shall deem it to be practicable and expedient to collect the sewage of such township, and to deodorize, utilize, consume or dispose of the same, by sale or otherwise, wholly or in part, it shall be lawful for said township committee to purchase lands in the corporate name of the township, and to erect all necessary buildings, works, and machinery thereon, and to take and appropriate for such purposes any lands and real-estate upon making compensation to the owner or owners, as hereinafter mentioned and provided.

7. *And be it enacted*, That whenever any ordinance shall be passed by such township committee, for making any improvement or performing any work under and by virtue of the provisions of this act, all further acts and proceedings which it may be necessary for said township committee to take to carry out said improvement or work to completion, and all orders relating thereto, may be by resolution, and not by ordinance.

8. *And be it enacted*, That whenever the township committee shall determine by ordinance to make and construct any sewer or sewers, drain or drains, or any sewage receptacle, or works, or place for treating and disposing of sewage, and shall deem it necessary to take and appropriate for any such purpose any lands and real estate, either within said township or beyond its limits, they are hereby authorized to treat with the owner or owners thereof for the same, and they may purchase said lands and real estate from the owners of the same, and make such compensation therefor as they may deem reasonable, and thereupon shall receive from such owner or owners a conveyance of such lands and real-estate to the inhabitants of such township.

9. *And be it enacted*, That when the township committee cannot agree as to price or compensation with the owner or owners of any lands and real-estate which they deem it nec-

essary to take and acquire, or when by the absence or legal incapacity of such owner or owners no such agreement can be made, it shall be lawful for the circuit court of the county in which such lands and real-estate are situated, on application in writing made on behalf of such township committee, and after notice of the time and place of making such application, published at least ten days previously thereto in some newspaper circulating in said county, to appoint three disinterested commissioners, who shall make an estimate and assessment of the damages that any such owner or owners will sustain, as well for the taking of his, her, or their lands and real estate, with the appurtenances, as for the injury to the owner or owners by reason of the intended improvement; if any of said commissioners die or refuse to act, the said court shall immediately make appointment of a proper person to fill any vacancy so created; the said commissioners shall be sworn to make a just and impartial estimate and assessment, and shall present without delay to the said court a report in writing of such estimate and assessment, which shall be sufficient if signed by a majority of said commissioners; the circuit court shall direct notice to be given by advertisement in some newspaper circulating in said county, for at least ten days, of the time and place at which said court will proceed to consider said report and any objection that may be made thereto, and shall have power to consider said report and the objections thereto in a summary way, and to revise and to confirm said report with or without alteration; said report, when confirmed by the court, or a copy thereof duly certified by the county clerk, shall at all times be plenary evidence of the right of the township committee to enter upon, take and use the said land and real-estate with the appurtenances; the township committee first tendering to the owner or owners thereof, if resident in this State, the amount so awarded to them; and if any owner is not a resident of this State, or on due inquiry cannot be found therein, or is a lunatic or idiot, or under age, or is for any other cause incapacitated to receive the amount awarded, or will not receive the same and sign a proper receipt therefor when tendered, then affidavit shall be made of the facts and filed in the office of the county clerk, and the amount awarded to any such owner shall be deposited in said circuit court before said township committee shall have the right to take and use the said lands and real estate; the court shall settle and determine the compensation to be paid to the commissioners, and the costs and expenses of the application and report which shall be paid by the township in behalf of which the application has been made.

10. *And be it enacted*, That it shall be lawful for the township committee to keep the sewers, drains and works in repair and working order, and to make, establish and enforce regulations and conditions as to the management and use of the same, and as to connections therewith, and they shall have power, and it shall be their duty, beneficially and efficiently to control the use of such sewers and drains, and to prevent and stop all abuses and improper uses of the same.

11. *And be it enacted*, That for the purpose of paying the costs and expenses of the improvements and public works, and of the proceedings in relation thereto, as mentioned in this act, or any of them, it shall be lawful for the township committee to borrow money from time to time, and to secure the payment of the same by issuing the corporate bonds of the inhabitants of such township, payable at such times as said committee may determine, which bonds, when issued by resolution of the township committee, and under the township seal, shall be the valid obligations of such municipal corporation according to their tenor; provided, however, that said bonds shall bear interest at a rate not exceeding six per centum per annum, shall be sold for not less than their par or face value, and provided also, that in no case shall bonds be issued to an amount which shall cause the entire corporate indebtedness of such township, for all purposes, to exceed at any time ten per centum of the assessed valuation of property in said township as shown on the duplicate of assessment.

12. *And be it enacted*, That it shall also be lawful for the legal voters in such township at their annual meeting to vote, grant and raise such sum or sums of money from year to year to be expended by the township committee under the provisions of this act as a majority of said legal voters shall determine.

13. *And be it enacted*, That for the purpose of paying the interest and principal of the bonds to be issued under the provisions of this act, it shall be the duty of the township committee each year to issue a warrant to the assessor of such township, directing him to assess upon the property subject to taxation in said township a sum equal to the amount of principal and interest which will fall due during the then current fiscal year; and all money so by warrant directed to be assessed, as well as any money voted and granted by the legal voters as herein provided, shall be assessed, levied and collected by the same persons, in the same manner, at the same times, and under the like fees, fines and penalties as the money raised by taxation in said township for other township and for county purposes.

14. *And be it enacted*, That all acts and parts of acts inconsistent with the provisions of this act be and the same are hereby repealed, and this act shall take effect immediately, except that no provision of any act which prohibits the pollution of any of the waters of this State used to supply any aqueduct or reservoir, or which are distributed for public use, is intended to be hereby repealed; and this act shall not be construed to authorize the discharge of sewage or the contents of sewers into fresh water, or into any portion of a river or stream tributary thereto, in such a manner as to defile a source of public water-supply.

Approved March 4, 1884.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

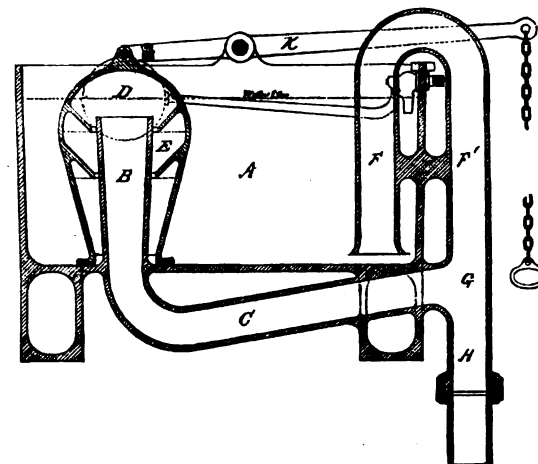
FLUSHING-TANK.

OUR illustration shows a novel form of flushing apparatus for water-closets, drains, etc., in which a compound syphon, part of which is operated mechanically, is made to produce the flush.

The action is as follows:

The cistern having been filled by the ball-valve, the water rises in the air-vessel until it reaches the edges of the blades or disks E E, and confines the air underneath them, thus forming additional air-vessels round the interior of the air-vessel D.

The air thus compressed underneath the blades by the pressure of the water in the cistern keeps back the bulk of the water tending to rise in the air-vessel. By making the air-vessel D of the shape shown on the drawing, a greater area is obtained in the crown or upper part than at the mouth. The quantity of air compressed in the crown prevents the water that has passed through the holes in the centre of the blades from rising to the top of the pipe B, as long as the vessel remains at rest. The cistern being then full, if the lever K is pulled down by means of the chain the air-vessel will be raised a short distance, and the air within being thus removed further from the water, allows the latter to rise and run down the pipe B. The air



having then been withdrawn from the air-vessel by means of the water rushing down the pipe B, a syphon action is established in the pipe B and the air-vessel D, which together form an annular syphon. The water from this syphon falls into and passes through the pipe C until it reaches the junction G, when it passes down the fall-pipe H, and exhausts or draws the air from the other syphon-pipe F, and thereby sets it in motion.

It is the invention of Mr. William Devoll, of Boldmere Road, Erdington, county of Warwick, England.

ARTESIAN-WELL BORING.

AN interesting illustration of the uncertainties of well-boring operations has just occurred at Burton-on-Trent. One of the largest breweries there had occasion to increase its water-supply. Recourse was had to boring, and the work was carried out by a local well-sinker. The spot chosen proved an unfortunate one, and after a depth of 176 feet had been reached, Messrs. Le Grand and Sutcliffe, artesian-well engineers of London, were consulted as to further search for water. This firm having had considerable experience in well-making operations at Burton, advised the abandonment of the boring, and suggested a fresh site, which they selected. This suggestion was adopted, and at a depth of 114 feet a supply of between 5,000 and 6,000 gallons per hour has been obtained from a single 5-inch tube-well. It should be mentioned that the level of the two sites was practically identical, and the distance between them about 200 yards.—*Engineering, London.*

Reviews of Books.

ANNUAL REPORT OF THE NATIONAL BOARD OF HEALTH, 1882. 672 pp. 8vo.

This bulky volume, which is nearly doubled in thickness by a large number of folding tables and diagrams, forms Executive Document No. 5 of the Senate of the Forty-Seventh Congress, second session. The report of the board itself, occupying forty-seven pages of the work, was duly noticed in *THE SANITARY ENGINEER* of December 14, 1882. Of the appended papers, which occupy the greater part of the book, the last is the only one of which some notice has not already been given. This is a second report on the filtering capacity of soils, by Professor Raphael Pumpelly, assisted by Dr. George A. Smyth, and although the experiments were not completed, owing to the sudden stoppage of the work and closure of the laboratory on account of want of funds, and although no full discussion of the extensive series of tabulated results is given, it is, nevertheless, a valuable contribution to existing knowledge on this subject.

After referring to their previous report, which had shown that a comparatively thin layer of sand, asbestos, ashes, etc., would filter out living germs from air drawn through it, they state that of eighty-one of these dry filters in constant use, all but four were perfect at the end of two years. Of thirty-six air filters constructed of spongy iron of various degrees of fineness, thirty-two were intact at the end of fourteen months.

The experiments show that there is a great difference between the filtering capacity of fine and of moderately fine particles. The rapidity with which the air is drawn through the filter has also a marked influence on the results. The results of the filtration of putrescible infusions through various media are very interesting. Into six empty sterilized tubes such an infusion was filtered through spongy iron, the filtration lasting one day. The tubes were then hermetically sealed. When opened six and seven months later, no bacteria were found, and the infusions did not decompose when exposed freely to the air. Chemical analysis showed that the albuminoids and phosphates—in other words, the nutritive materials for lower organisms—had been wholly removed.

When the filtered fluid was run into tubes containing sterilized-beef infusion, one broke down and three remained uninfected. Asbestos was found to filter out the spores, but not the organic matter.

Another interesting series of experiments related to the transmission of germs from liquids into air. In the experiments described in the former report it was found that sewage could be suspended in a sterilized atmosphere over sterilized-beef infusion without infecting the latter at the ordinary temperature of the room. In five such experiments the beef infusion remained uninfected in two, after fifteen months' exposure, but two others had become infected so as to suggest the possibility of the transmission of spores with the vapor of evaporation. Four other experiments of the same kind were made with fluids, sewage, urine, beef infusion and water. They required replenishing twice, but in all four the test infusion remained uninfected at the cessation of the work, after about fifteen months. Five other experiments were made with sand saturated with the same liquids. Two of these were spoiled by accidents, one, saturated with urine, remained intact at the end of a year, and the remaining two, saturated with sewage, broke down after ten months. It will be seen that these results correspond with those obtained by Wernich, and show that germs are not given off from the surface of liquids containing them, unless portions of the liquid are thrown into the air in the form of spray by bubbles bursting at the surface.

A few experiments made to determine the presence of the bacteria of putrefaction in dry soils at various depths, indicated that such bacteria exist in soil to a depth of at least six feet, but not at a depth of nine feet.

While the methods of culture and testing for the presence of micro-organisms used in these experiments are not such as would now probably be used, in view of the advantages attending the employment of semi-solid culture media, and while an unnecessary amount of time seems to have been spent on some of the experiments, the details of the several experiments given in the extensive series of tables which follow the report are very interesting, and should be consulted by all who are engaged in similar investigations.

The Report on Water Analysis, by Professor Mallet, with its extensive series of tables and diagrams, is the most valuable paper on this subject which has yet been published.

The general conclusions of Professor Mallet, as contained in his preliminary report, which was published as one of the Supplements of the National Board of Health Bulletin, have already been noticed in *THE SANITARY ENGINEER*. The completed report, however, merits careful study by all who are interested in water analysis.

We have no space within the limits of such a notice as this to even refer to the many suggestive points of this report, but as a specimen we may select the observations made by Dr. Smart upon the peculiar behavior of solutions of urea, as to the rate at which they evolve ammonia when distilled with sodium-carbonate. He thinks that "a water which in the third or fourth measure of its distillation by the Wanklyn process gives a persistent evolution of 'free ammonia,' which is followed in the progress of the experiment by a persistence of twice that quantity of 'albuminoid ammonia,' probably contains urea, and that even upon these facts may be based an approximate estimate of the amount of urea present, for since 1 mgrm. of urea (in the usual charge of one-half liter of water), gives a persistent evolution, with or without carbonate of soda, of .01 mgrm. in each measure, and .02 in each after the addition of the alkaline permanganate, a water which yields these quantities from the usual charge of 500 c.c. will contain 1 mgrm. of urea in the charge, or as many parts per million of urea as there are hundredths of a mgrm. of albuminoid ammonia persisting in each measure. But the importance of the element of time in connection with this quantitative statement must always be borne in mind. It is true only when the distillation is carried on rapidly, as directed by Wanklyn, with the bottom of the retort well in the flame. This yields the 50 c.c. measure in 10 or 11 minutes. If the distillation is carried on slowly, so that 20 minutes are required to distill the measure, the persisting evolution will be doubled, and the urea, if calculated therefrom, will be higher than the reality." This is a hint for further experiment in this direction, since a test for urea which should distinguish it from other matters of organic origin, and permit of its quantitative determination, would be of enormous advantage in water analysis for sanitary purposes.

The Report on the Nature of Diphtheria, by Drs. Wood and Forman, those on Trap Syphonage, by Col. Waring and Messrs. Philbrick and Bowditch, On the Sanitary Condition of Newport, by Mr. Bowditch, and On the Registration of Vital Statistics, by Dr. Billings, are all valuable papers, which were noticed a year or more ago in *THE SANITARY ENGINEER*. The appendix to Dr. Billings' report, containing copies of the registration laws of the several States, with notes as to results obtained, will be found very convenient for reference.

Taken as a whole, the volume is one that is highly creditable to the board, and one that every sanitarian and sanitary engineer should endeavor to obtain a copy of.

NATIONAL ASSOCIATION FOR THE PROMOTION OF SOCIAL SCIENCE. A manual for the Congress, with a narration of past labors and results. By J. L. Clifford Smith, Secretary. London, 1882. 8vo.

Those who are interested in the Social Science Association of Great Britain will find this a convenient memorandum to consult. The object of this body is to reform everything, and to improve everybody who does not belong to it, and it is therefore quite popular. It has done something toward educating public opinion as to the need for sanitary legislation, and as to the direction which that legislation should take, and in various other directions has afforded an outlet for the energy and a means of publication for the views of reformers, thus meeting a want of our growing civilization, and we feel safe in predicting a long and prosperous life for it.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The American Public Health Association will hold its twelfth annual session in St. Louis, commencing Tuesday, October 14, and continuing four days. A circular has been issued by the chairman of the association, calling attention to the importance of the organization, in which the commercial and manufacturing world must ever have a deep interest. The circular states that it is the wish of the committee of arrangements to actively interest the commercial and professional men of the city in the objects as well as the reception and entertainment of the association.

The St. Louis Chapter of the American Institute of Architects has just been formed and received papers of recognition from the head association at New York.

INSPECTION OF ILLUMINATING-OIL IN IOWA.

THE Legislature of Iowa has passed a new act relating to the inspection of illuminating-oil in the State. It was approved on the 14th day of April last, and went into effect immediately. The law provides for the inspection and branding of all illuminating-oil offered for sale in the State, and fixes the standard at a flashing-point of 100° F. It also provides for the appointment of an inspector and deputy inspectors. The State Board of Health is charged with the duty of selecting an instrument and formulating rules for the testing of oils. The board has adopted the tester employed by the Board of Health of this State. The inspectors are paid by the person for whom the inspections are made, at a fixed schedule of prices.

TESTING GAS.

THE Gas Referees of London have issued their instructions for the summer, in which the sulphur limit is fixed at 17 grains per hundred cubic feet of gas, and the ammonia limit at four grains. London has eighteen testing-stations—twelve for the Gas-Light and Coke Company, two for the Commercial Company, and four for the South Metropolitan Company. The *Journal of Gas-Lighting*, commenting on the solicitude of the Metropolitan Board of Works for the gas-supply, says: "When one notices these elaborate and costly arrangements for detecting any microscopic shortcomings in the gas-supply of London, and remembers the crying evils of adulteration in food and drink, and other necessities of life, that, although directly affecting the health of the community, are allowed to pass unchecked under the noses of the metropolitan authorities, the ridiculous aspect of all this exaggerated gas-testing becomes very apparent. It might be difficult to define the damage that would be suffered by the community through the deficiency of half a candle in illuminating power, or a superabundance of a grain of sulphur in the output of one of the gas-supplying stations; but, in any case, would it be equal to that of a successful day's milk-watering over the same area?"

NEW YORK BOARD OF PHARMACY.

A SPECIAL meeting of the Board of Pharmacy of the City of New York was held at the College of Pharmacy, in this city, on Monday evening last. The meeting was called to order by President McIntyre. By the Secretary's report it was stated that there are 2,019 registered pharmacists in this city, 860 of whom are proprietors and 1,159 assistants. In the past three years there have been some 300 arrests of people who were dispensing drugs without a certificate. Out of 107 examined 63 were unable to pass. The election of a new board resulted in the selection of the following gentlemen: Drs. William Balser, William Mittendorf, George E. Needham, Mr. E. L. Milhau, Ph. G., Prof. P. W. Bedford, Ph. G.

CHOLERA.

ON the 29th of April the troop-ship *Crocodile* arrived at Spithead from Bombay, having had six fatal cases of cholera during the voyage. The last case occurred nine days before arrival. The comment of the *Lancet* on this news item is that "the main lesson we at home have to learn from the occurrence is that we have once more come within measurable distance of the importation of cholera into this country from the East by means of one of the most frequented lines of human intercourse, and that the disease is one the spread of which can be most effectually frustrated by having at hand measures for the immediate isolation of the sick, and by the removal from our midst of all known sources which may give rise to the pollution of the air we breathe or of the water we drink."

WACO, TEXAS.—A proposition from the Waco Water Company for a new contract with the city is under consideration by the committee appointed at a recent meeting of the City Council, which, it is rumored, will be reported upon favorably at the next meeting. Under the contract proposed the city is to take 83 hydrants, at \$100 each, the contract to run twenty years from its acceptance. The Water Company obligates itself to build a reservoir of sufficient capacity to supply the demands of the city, and to place hydrants on mains not less than four inches in diameter. Considerable interest is already manifested by the public in the matter, and lively times may be expected when it is presented to the council for action.—*Engineering News*.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MAY 24, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	13	19.3	1	7.6			3			1				1								
Boston	Mass.	427,900	150	18.2	36	24.0	8		28	3	2	5	2	3		14	1	4			3			
Lowell	Mass.	70,000	24	17.8	7	29.1			6					1		2								
Worcester	Mass.	68,000	21	16.0	6	28.5	2		4			1				2		1	1					
Fall River	Mass.	65,000	13	10.4	4	30.7		1	2															
New Haven	Conn.	68,000	26	19.9	7	26.9	2	2	4							4								
Providence	R. I.	122,500	43	18.2	8	18.6	3		10	2	1	2	1			3	4							1
Total		856,400	200	17.6	69	23.7	15	3	57	7	3	9	3	4	1	9	25	1	5	1		3		1
EASTERN CITIES.																								
Albany	New York	101,200	55	28.3	23	21.7	1	1	10	3		2		1		3	5	2			2			1
New York	New York	1,341,400	648	25.1	245	37.8	33	4	95	15	22	17	3		5	16	67	25		20	14		11	3
Brooklyn	New York	664,100	237	18.5	90	37.9	10		33	3	7	4		1	5	10	15	20		7	5			
Hudson County	New Jersey	222,200	106	24.8	34	32.0	5	2	16	2	1	3		5	1	3	8		4		4			3
Newark	New Jersey	152,800	55	18.7	26	47.2	1		10	3		1		1			3	3						1
Philadelphia	Pa.	933,900	356	19.8	108	30.3	9	4	45	8	10	15	1	12		9	26	5	3	1	5		1	
Wilmington	Delaware	49,000	18	19.1	8	44.4			2	1	3					1					1			
Total		3,464,600	1,475	22.1	534	36.1	59	11	211	35	43	42	5	21	11	42	124	10	52	1	32	26	1	16
LAKE CITIES.																								
Buffalo	New York	103,800	39	19.5	11	28.2	1		2			1					4		3		1			1
Rochester	New York	103,800	39	19.5	11	28.2	1		2			1					4		3		1			1
Cleveland	Ohio	136,500	58	22.1	26	44.8		1	4	2		3	3			2	5		1		2			
Detroit	Michigan	640,400	241	19.6	143	59.3	9	2	16	1	19	17	2	3	1	7	14	2	15		10	3		3
Chicago	Illinois	142,400	51	18.6	30	58.8	4		9	1	5	4					4		1		2			
Total		1,023,100	389	19.8	210	51.9	14	3	31	4	24	25	5	3	1	9	27	2	20		14	6		4
RIVER CITIES.																								
Pittsburg	Pa.	204,300	73	18.6	24	32.8	10		5		2	4		3		4	9				2	2		
Cincinnati	Ohio	91,700	38	21.5	15	39.4	2												3					
Kansas City	Mo.	75,000	9	6.2	5	55.5											2							
Indianapolis	Ind.	91,700	38	21.5	15	39.4		3	9	1						2			3	1	1			
Minneapolis	Minn.	92,400	31	17.4	17	54.8	1	2	3	1	1	4		1			5		1		1			1
Evansville	Ind.	33,200	14	21.9	7	50.0	1		2							1	1				3			1
St. Louis	Mo.	367,300	108	15.3	33	30.5	7	1	15		2	6	1	1	2		6	2	3		1	1		
Total		863,900	273	16.4	101	36.9	21	6	34	2	5	14	1	6	4	4	23	2	10	1	8	3		1
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	33	12.8	8	24.2	3		6	1	1					3	3		1					
"	Col.	68,500	47	35.7	13	27.6	1		13	1	1		1			2	5		1					
Richmond	Va.	30,500	24	31.6	1	4.1			2		1			7							1			
Charleston	S. C.	30,000	24	41.6	8	33.3	1	1	2					4							1			
	Wh.	25,000	14	29.1	7	50.0			3		4													
Atlanta	Geo.	27,800	24	44.9	11	45.8			4								3				1			
	Wh.	30,000	9	15.6	5	55.5	1				2													
Augusta	Geo.	30,000	22	57.3	4	18.1	2	1	1		6			1			1				3			
	Wh.	20,000	7	18.2	5	71.4			7		4													
	Col.	15,000	6	20.8	5	83.3					1													
Nashville	Tenn.	35,000	11	16.3	4	36.3			2					1										
	Wh.	30,800	10	25.0	3	30.0		1	2					1					1					
Savannah	Geo.	23,800	14	30.6	3	21.4	1	1	2		2													
	Wh.	16,600	20	62.7	10	50.0					4													
	Col.	23,800	14	30.6	3	21.4	1	1	2		2													
New Orleans	La.	165,700	104	32.7	58	55.7	2		4		15			1	8		3		1	11	1	2		1
	Wh.	165,700	104	32.7	58	55.7	2		4		15			1	8		3		1	11	1	2		1
	Col.	60,700	79	67.8	30	37.9	5		8		7				6				1	7		9		
Total White		472,800	216	23.8	91	42.1	7	1	19	1	28			9	9	3	6		2	11	2	2		1
Total Colored		250,400	232	46.5	84	36.5	10	3	30	1	19		1	7	10	5	10		3	1	10	2	9	1
Total in 32 U. S. Cities		6,940,200	2,875	21.5	1,032	37.8	126	27	382	50	122	90	15	50	36	72	215	15	92	4	75	42	12	24
Total in 28 English Cities																								
May 10.	Total in 28 English Cities	8,762,354	3,666	21.8	106		106				47	13		35		66				176		22	194	
" 10.	" 8 Scottish Cities	1,254,607	600	24.9	13		13				12	11		6		7			148	17			41	
" 10.	" 16 Irish Cities	858,660	440	26.6	5		5		64		6			4		12			109	3			10	
Mar. 29.	" 142 German Cities	8,956,466	4,550	26.4	100		100		734	53	203	193		52		59			640	55	18	3	65	
April 5.	" 130 German Cities	8,345,498	4,520	26.6	115		115		719	52	228	167		27		57			590	51	22		54	
" 12.	" 137 German Cities	8,795,720	4,272	25.3	95		95		671	40	215	198		49		54			551	57	20	4	54	
May 3.	" 15 Swiss Cities	455,537	255	29.1	5		5		36		8	11		3		5			36		1		3	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the eighth half-year from the date of the taking of the last census; that is, to March 1, 1884.

During the week ending May 24, 1884, in 32 cities of the United States, having an aggregate population of 6,940,200, there died 2,875 persons, which is equivalent to an annual death-rate of 21.5 per 1,000, an increase of 1.6 over that of the previous week. In the North Atlantic cities the rate was 17.6; in the Eastern 22.1; in the Lake 19.8; in the River 16.4; and in the Southern cities, among the whites, 23.8, and among the colored 46.5 per 1,000. Of all deaths 37.8 per cent. were under 5 years of age, and the proportion of this class of death was highest in the Lake cities—viz., 53.9 per cent.

Accidents caused 4.3 per cent., consumption 13.2, croup 1.7, diarrhoeal diseases 4.2, diphtheria 3.1, typhoid fever 1.7, malarial fevers 1.2, scarlet fever 2.5, pneumonia 7.4, bronchitis 3.2, puerperal diseases 1.4, measles 2.6, small-pox 0.4 and whooping-cough 0.8 per cent. of all deaths. Consumption caused 19.6 per cent. of all deaths in the North Atlantic cities, and 14.3 in the Eastern cities. Diphtheria caused 6.4 per cent. of all deaths in the Lake cities, and 5.1 per cent. in the River cities; scarlet fever 3.0 per cent. in the North Atlantic cities, and measles 5.0 per cent. in the Southern cities among the whites, and 4.3 per cent. among the colored. Deaths from small-pox were reported in Philadelphia and New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 45 new cases of diphtheria, 61 of scarlet fever, and 8 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 22 new cases of diphtheria and 21 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 17 new cases of scarlet fever and 7 of diphtheria.

BALTIMORE, MD.—The Health Officer in his weekly report records 134 deaths, including 52 under 5 years of age. The annual death-rate for the whole population was 17.03 per 1,000, or 15.64 for the whites and 25.13 for the colored. Diphtheria caused 3 deaths, croup 1, scarlet fever 7, measles 4, whooping-cough 2, typhoid fever 1, malarial fevers 2, diarrhoeal diseases 6, consumption 21, acute lung diseases 16, and violence 2.

CHARLESTON, S. C.—May 10: Deaths, white, 10; colored, 20; annual death-rate per 1,000, white, 20.8; colored, 38.1. Diarrhoeal diseases caused 7 deaths, consumption 6, malarial fever 1, acute lung diseases 2, and violence 1.

May 17: Deaths, white, 13; colored, 19; annual death-rate per 1,000, white, 27.0; colored, 36.1. Diarrhoeal diseases caused 1 death, consumption 2, malarial fever 1, acute lung diseases 2, and violence 1.

MASSACHUSETTS.—During the week ending May 17, in 103 towns of the State, having an aggregate population of 1,409,314, there were 447 deaths, which is equivalent to an annual death-rate of 16.35 per 1,000. Of the decedents under 5 years of age there were 115. The highest death-rates recorded were 32.7 in New Bedford, and 24.3 in Gloucester. The principal infectious diseases caused 49 deaths, among which were diphtheria and croup 15, scarlet fever 10, diarrhoeal diseases 8, cerebro-spinal meningitis 5, typhoid fever 4, whooping-cough 3, and puerperal fever 3. To consumption were

attributed 81 deaths, and to diseases of the respiratory organs 55.

DISTRICT OF COLUMBIA.—The Health Officer in his report for April records 400 deaths, whites 225, colored 175. This gives a death-rate of 21.42 per 1,000 for the whites, and 30.30 for the colored, and 24.0 for the whole population. The rate for the whole population exceeds the average of the corresponding month for the past 10 years by .31. The number of deaths under 5 years was 127, or 31.7 per cent. of the total mortality. The diseases causing the largest number of deaths were consumption 73, or 18.2 per cent. of all deaths, pneumonia 42, or 10.5 per cent., and scarlet fever 30, or 7.5 per cent. Diphtheria and croup caused 8 deaths, typhoid fever 5, malarial fevers 6, whooping-cough 4, diarrhoeal diseases 4, and violence 10.

SCOTLAND.—The death-rate in the 8 principal towns during the week ending May 10 was 24.9 per 1,000. Whooping-cough continues to be the most fatal zymotic disease.

Glasgow.—Deaths, 285; annual death-rate, 23.6 per 1,000. Measles and diphtheria each caused 5 deaths, scarlet fever 6, whooping-cough 18, diarrhoea 3, acute lung diseases 78, and violence 5.

Edinburgh.—Deaths, 111; annual death-rate, 23.4. Scarlet fever caused 1 death, diphtheria 2, measles 3, whooping-cough 16, diarrhoea 4, acute lung diseases 76, and violence 3.

IRELAND.—The average annual death-rate in the 16 principal town districts for the week ending May 3, was 27.4 per 1,000.

Dublin.—Deaths, 207; annual death-rate, 30.7 per 1,000. Measles and diphtheria each caused 1 death, scarlet fever 8, whooping-cough 5, typhoid fever 2, consumption 25, acute lung diseases 57, and violence 2.

Belfast.—Deaths, 103; annual death-rate, 24.7 per 1,000. Scarlet fever and whooping-cough each caused 2 deaths, typhus and typhoid fever each 1, diarrhoea 2, acute lung diseases 35, consumption 12, and violence 2.

IRELAND.—The average annual death-rate in the 16 town districts for the week ending May 10 was 26.6 per 1,000. Scarlet fever and whooping-cough were the most fatal zymotic diseases.

Dublin.—Deaths, 208; annual death-rate, 30.8. Measles and diphtheria each caused 1 death, scarlet fever 6, typhoid fever 2, consumption 29, diarrhoea 1, acute lung diseases 46, and violence 3.

Belfast.—Deaths, 99; annual death-rate 23.8. Measles caused 1 death, whooping-cough 2, scarlet fever 3, diarrhoea 2, consumption 16, and acute lung diseases 32.

FRANCE.—Paris.—During the week ending May 8 there were 1,228 deaths against 1,153 for the preceding week. The annual death-rate was 28.5 per 1,000. Typhoid fever does not decrease, having caused 43 deaths, against 39 for the preceding week. Diphtheria has gradually but very slowly decreased, and caused 51 deaths. Small-pox caused 2 deaths, scarlet fever 3, whooping-cough 14, measles 50, diarrhoeal diseases 52, consumption 210, pneumonia and bronchitis 147, and violence 30.

BELGIUM.—Brussels.—Week ending April 26: Deaths, 215; annual death-rate, 26.2 per 1,000. Small-pox caused 13 deaths, scarlet fever 1, typhoid fever 3, croup 7, whooping-cough 5, diarrhoeal diseases 10, bronchitis and pneumonia 41, consumption 39, and violence 5.

BELGIUM.—Brussels.—Week ending May 3: Deaths, 210; annual death-rate, 25.5 per 1,000. Small-pox caused 19 deaths, scarlet fever, diphtheria, and whooping-cough each 1, typhoid fever 4, diarrhoeal diseases 20, consumption 23, acute lung diseases 29, and violence 6.

GERMANY.—Berlin.—Week ending April 19: Deaths, 580; annual death-rate, 24.6 per 1,000. Measles caused 3 deaths, scarlet fever 6, typhoid fever 3, diphtheria 60, whooping-cough 5, diarrhoeal diseases 28, and acute lung diseases 32.

AUSTRIA.—Vienna.—Week ending April 19: Deaths, 487; annual death-rate, 33.3 per 1,000. Small-pox caused 1 death, measles 11, scarlet fever 1, typhoid fever 3, diphtheria 10, whooping-cough 3, diarrhoeal diseases 17, and acute lung diseases 87.

DENMARK.—Copenhagen.—Week ending April 29: Deaths, 107; annual death-rate, 20.8 per 1,000. Diphtheria caused 1 death, croup 2, whooping-cough 3, diarrhoeal diseases 6, consumption 9, acute lung diseases 18, and violence 4.

DENMARK.—Copenhagen.—Week ending May 6: Deaths, 124; annual death-rate, 24.1 per 1,000. Diphtheria and croup caused 4 deaths, typhoid fever 1, diarrhoeal diseases 6, consumption 14, acute lung diseases 16, and violence 2.

RUSSIA.—St. Petersburg.—Week ending April 26: Deaths, 841; annual death-rate, 47.2 per 1,000. Small-pox caused 2 deaths, measles 72, scarlet fever 18, typhoid fever 26, diphtheria 12, whooping-cough 5, diarrhoeal diseases 109, and acute lung diseases 103.

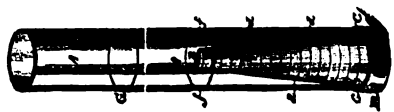
ITALY.—Turin.—Week ending April 19: Deaths, 174; annual death-rate, 34.3 per 1,000. Small-pox caused 11 deaths, measles 3, typhoid fever 3, diphtheria and croup 8, whooping-cough 3, diseases of the respiratory organs 35, diarrhoeal diseases 24, and violence 7.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

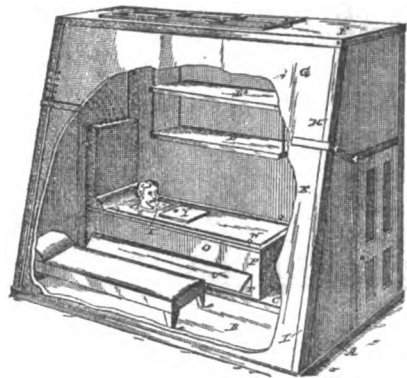
294,082. LACTOMETER. ALBERT R. LEEDS, Hoboken, N. J. Filed September 17, 1883. (No model.) Issued February 26, 1884.



Claim.—An instrument for testing milk, consisting of the glass vessel A, in combination with the conical

stopper B, made of any non-transparent material, on which are drawn lines at regular intervals parallel to the circumference of its base forming a graduated scale, substantially as described.

294,180. BATHING APPARATUS. JOHN RANSOM, Williamsport, Pa. Filed June 15, 1883. (No model.) Issued February 26, 1884.



Claim.—1. A portable cabinet for bathing purposes, the bottom of which is composed of one or more shallow pans adapted to retain water that may be splashed over from the bath tub or tubs, substantially as set forth.

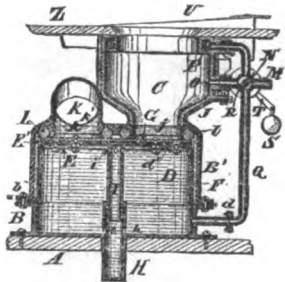
2. A portable cabinet for bathing purposes, the bottom of which is composed of shallow pans adapted to be set or fitted within each other, or nested together substantially as and for the purpose herein set forth.

3. A portable cabinet for bathing purposes, the bottom of which is composed of shallow pans adapted to be nested together, each pan being provided with end walls adapted to be fitted between the end walls of the pan next behind, substantially as set forth.

4. A portable cabinet for bathing purposes, consisting essentially of bottom pans adapted to be nested together, a rear wall secured vertically to the rear edge of the rear pan, end walls secured vertically to the ends of the rear pan, a top secured to said rear and end walls, a hood depending from the front edge of said top, and having triangular end pieces, end walls, and a front wall secured to the ends and front edge of the front pan, and connected detachably to the end walls of the rear pan and to the hood, and suitable means for ingress and egress, and for ventilation, substantially as set forth.

5. The combination, with a portable cabinet for bathing purposes, having its bottom constructed of two or more shallow pans adapted to be nested together, of a bath-tub arranged to fit in or between the sides of the rear pan, substantially as set forth.

294,185. WATER-CLOSET. EMIL BAUDE, Cincinnati, O. Filed July 18, 1883. (No model.) Issued February 26, 1884.



Claim.—1. In a water-closet, the combination, with the soil-hopper and soil-pipe having downwardly-presented ports in the same horizontal plane, of the duplex valve, to seat upwardly and simultaneously against said ports by the pressure of water-supply.

2. In a water-closet, the combination, with hopper and soil-pipe having downwardly-presented ports in the same horizontal plane, of duplex valve, hat-formed diaphragm, and temporary receiver.

3. In a water-closet, the combination, with temporary receiver B B' and diaphragm D, of the double-seating valve G, whose tubular and perforate stem I occupies a tubular perforate guide H, in the reservoir-floor, as and for the purpose set forth.

4. In a water-closet, the described organism, to wit: a soil hopper or bowl and a soil-pipe, both ported downward and at the same level, a valve whose gravity during use of the closet opens both ports simultaneously, and which on vacation of the closet closes both ports simultaneously by pressure of the water-supply, a four-way cock, N, and an operating instrumentality, substantially as set forth.

293,997. APPARATUS FOR RAISING WATER. THOMAS ARTHUR, Bangor, Pa., assignor to himself and Robert James Nagle, same place. Filed March 7, 1883. (No model.) Issued February 26, 1884.

294,007. SMOKE AND GAS-CONSUMING FURNACE. HENRY M. BRADY, Dalton, Ill. Filed November 5, 1883. (No model.) Issued February 26, 1884.

294,008. ELECTRIC FIRE-ALARM AND FIRE-EXTINGUISHER SYSTEM. CHARLES E. BUELL, New Haven, Conn. Filed December 22, 1883. (No model.) Issued February 26, 1884.

294,016. CAR-VENTILATOR. WILLIAM E. COWEN, Defiance, Ohio. Filed October 9, 1882. Renewed August 15, 1883. (No model.) Issued February 26, 1884.

294,022. OIL-CUP. JOHN J. FAWCETT, Springfield, Ohio. Filed December 17, 1883. (No model.) Issued February 26, 1884.

294,026. ROTARY-METER. BENJAMIN FITTS, Worcester, Mass. Filed October 11, 1883. (No model.) Issued February 26, 1884.

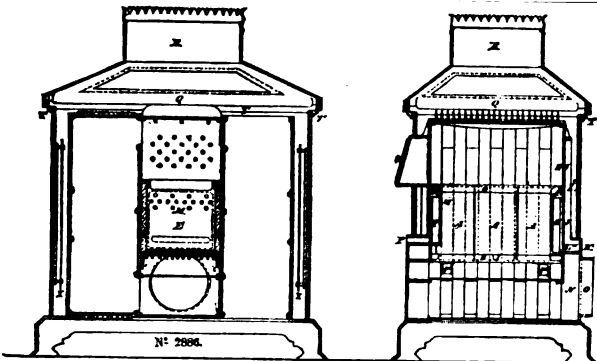
294,084. CUTTING-PLIERS. THOS. G. HALL, Brooklyn, N. Y. Filed July 25, 1883. (No model.) Issued February 26, 1884.

294,049. TILE-DITCHER. KERWIN JAMES, Adair, Iowa. Filed April 30, 1883. (No model.) Issued February 26, 1884.

English Patents.

2,886. IMPROVEMENTS IN STOVES OR AIR-HEATING APPARATUS.

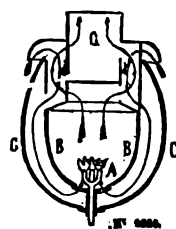
The first part of the invention has reference to the stoves or air-heating apparatus described in the specifications of previous Letters Patent granted to the same person, and dated respectively December 15, 1877, No. 4,773, and March 5, 1880, No. 968, and consists of certain



modifications of same in order to adapt them for the employment of gas as fuel instead of coal, coke, or wood. SAMUEL CLELAND DAVIDSON, of Belfast, in the county of Antrim, Ireland, merchant. Prov. Spec. June 9, 1883. Letters Patented December 8, 1883. (Price 8d.)

2,953. IMPROVEMENTS IN REGENERATIVE LAMPS AND GAS-BURNERS. A communication to me from H. Studer, of Paris, engineer.

FIG. 1.



This invention relates to improvements in regenerative lamps and gas-burners, that is to lamps and gas-burners in which the air serving to feed the flame is previously heated by the combustion-gases from the latter.

CARL PIEPER, civil engineer, Berlin S. W., Prussia. Prov. Spec. June 14, 1883. Letters Patented December 8, 1883.

Association News.

WILMINGTON, DEL., MASTER PLUMBERS.—A special meeting of the association was held May 26, Mr. Gawthrop presiding, for the purpose of considering the advisability of sending delegates to the Baltimore convention. It was resolved that the association be represented at the convention, and the following delegates were elected: Alfred Gawthrop and Joseph H. Jones; alternates, John C. Brison and Thomas Riley. There being no other business the meeting then adjourned.

THE ASSOCIATION OF MEDICAL SUPERINTENDENTS OF AMERICAN INSTITUTIONS FOR THE INSANE met at Philadelphia May 13, in its thirty-sixth annual session. It represents 120 institutions, containing 4,800 inmates.

KENTUCKY STATE BOARD OF HEALTH.—The State Board of Health met at Louisville, May 14. The Secretary, Dr. J. N. McCormack, presenting a report for the last quarter, stated that fifteen county boards of health had been organized in that time, leaving but twelve counties in the State without boards. He gave a résumé of the Washington meeting of State Boards of Health. It was decided to devote the available funds to the investigation of adulterations of food and drugs, and to the examination of illuminating-oils.

JOURNEYMEN PLUMBERS' PICNIC.—The annual picnic and athletic games of the journeymen plumbers of this city occurred on Tuesday afternoon and evening, at Sulzer's Harlem River Park. The athletic games, which consisted of tugs of war, half-mile runs, mile walk, potato race, sack race, etc., commenced at about two o'clock, and were witnessed by a large number of people, who showed their appreciation by frequent applause. After the completion of the games the company adjourned to the large hall on the grounds, where dancing was indulged in both in the afternoon and evening. Good order prevailed throughout the exercises, and the entertainment is pronounced as being satisfactory in every respect. The Committee of Arrangements for the picnic were: Edward McCabe, Chairman; Peter J. Carpenter, Secretary; Joseph Green, Joseph Barr, James Mulvey, John Neill, John F. Rooney, John Kehoe, James Malloy, John Evans.

Notes.

CONSTRUCTION.

BOSTON, MASS.—The Committee on Public Library in this city offer premiums of \$4,000, \$3,000, \$2,000, and \$1,000, for the best plans for the building. The competition will be open until August 1. Plans must be sent to the Trustees of the Public Library, Boston, Mass.

LEXINGTON, MO.—Proposals for constructing water-works will be received by the Committee on Water-Works, E. Winsor, W. B. Hamlet, Thomas and Gilson, subject to the approval of the people at the polls, June 10.

ANN ARBOR, MICH.—Mayor Harriman has appointed a committee consisting of Judge Cooley, ex-Governor Felch, Christian Eberbach, Prof. V. C. Vaughan and Charles E. Hiscock, with authority to employ experts, receive bids, and generally examine into the feasibility of constructing public water-works for the city.

CHICAGO.—Contracts with the city are awarded for 1,410 tons of water-pipe, the Lake Shore Foundry receiving the contract for 12-inch pipe at \$29.50, and the St. Louis firm of Shickle, Harrison & Howard taking the others as follows: 4-inch, \$32.50; 6-inch, \$31.75; 8-inch, \$31.75; 16-inch, \$27.95; 24-inch, \$27.89. The other competitors were the Cincinnati & Newport Co. and the following Chicago houses: A. H. McNeal, R. D. Wood, George B. Hayes, and D. Long & Co.

TRENTON, N. J.—William A. Johnson, of Boston, has the plumbing contract in the Lawrenceville school buildings.

WILMINGTON, DEL.—Bids for the plumbing of the new County Buildings were received by the Building Committee on the 22d, as follows: J. C. Brison, Wilmington, \$6,000; John Worthington, Philadelphia, \$6,450; Kline Bros., Philadelphia, \$8,100; Gawthrop & Bro., Wilmington, \$8,250. The contract has been awarded to J. C. Brison. The job is to be completed by August 20. The plans and specifications were prepared by Gawthrop & Bro., and J. C. Brison.

MINNEAPOLIS, MINN.—The West Hotel, by Architect Buffington, will be completed July 1. The plumbing and gas-fitting by Cauvet, the plumber, will cost about \$60,000.

JERSEY CITY WATER-SUPPLY.—Mr. Andrew Clerk, C. E., has submitted to the Jersey City Board of Public Works another scheme for procuring better water. He proposes to extend a wrought-iron pipe, 4½ or 5 feet in diameter, three miles up the Passaic from the Jersey City Pumping-Works, to a point where analysis shows that the Paterson sewage has become the most purified and the Newark sewage carried up by the tide does not extend. The cost of the pipe he estimates at \$140,000.

BUILDING COMPANY.—The Morris Building Company, to carry on operations in Kings County, N. Y., was incorporated May 27, with a capital of \$100,000. The trustees are William Phelps, Frank F. Kimball, Alfred Ely, George W. Penwarden, and Norman P. Heffley.

ST. LOUIS, MO.—The Board of Public Improvements, on the 26th ult., granted water-pipe extensions in various streets to the amount of \$13,850.

FREDERICKSBURG, VA.—The contract for the construction of the new water-works has been awarded Col. W. W. Taylor, of Havre de Grace, Md., who by the terms of contract is to commence the work by the 1st of June and complete it by the 1st of October.

WATER-WORKS TUNNEL.—The Washington, D. C., Star contains the following particulars about the tunnel now constructing for the water-supply of that city. The tunnel is to be 11 x 7'6" and 21,000 feet long, through solid rock. It will convey the water from the present distributing reservoir to the new one, which is to be large enough to supply all the demands of the National Capital for many years to come. The contractors, Messrs. Beckwith & Quackenbush, have sunk five working shafts on the line of the tunnel. The work is pushed forward night and day. Compressed air has been adopted by the contractors as a motive power, not only for the drills to be used, but also for all hoisting, pumping, and ventilating purposes.

The contract requires four drills in a heading, or twenty-eight drills in all. The power required to run this combined plant was necessarily great, and formed a serious item in the preliminary work. The supply of fuel being a leading consideration, the central station was located near the mouth of Rock Creek, and directly upon the Chesapeake and Ohio Canal, where coal could be delivered at a minimum cost. The power is furnished by six tubular 100 horse-power boilers, each 66 inches in diameter and 14 feet long, arranged in one battery. Four Ingersoll "straight-line" compressors, of 150 horse-power each, compress the air. To convey the compressed air to the working faces of the tunnel, a pipe line five miles long over ground is required, and by the time the tunnel is completed, ten miles of pipes will be in use.

NEW YORK HARBOR.—A bill to prevent the dumping of refuse into New York Harbor has been introduced in the House of Representatives by S. S. Cox. It provides for the appointment by the President of an officer from the corps of Engineers of the United States Army, to be known as the Superintendent of New York Harbor. His duties are to be to carry out the provisions of the act, to grant permits designating the limits within which deposits may be made in the harbor, and to establish a patrol of the harbor to detect transgressions of the act. Suitable penalties are prescribed, and an appropriation of \$30,000 is provided for to enable the superintendent to carry out his work.

MADISON, WIS.—Architects Koch & Co., of Milwaukee, have completed the plans for the Dane County Court-House; \$150,000 have been appropriated for its construction. It will be entirely fire-proof. The cost of the building, without heating, will be \$135,000. The contract for the superstructure has been let to D. Stevens.

CIVIL ENGINEER EDWARD HEMBERLE has contracted to build or repair a number of bridges on the Louisville, New Albany and Chicago Railroad, the outlay to be \$70,000. One bridge, costing \$10,000, is over the Calumet River, five are on the main line, with one new one, and eight to be repaired on the Indianapolis Branch.

PHILADELPHIA.—The Gas Trust has awarded the contract for a 70 horse-power locomotive-boiler, and a pump of a capacity of 400 gallons per minute to the Southwark Foundry and Machine Company, for \$734.

PITTSBURG, PA.—Charters have been granted to the Acme Heating Company, the Acme Fuel Company and the Braddock Fuel Company. The three companies, controlled by the Boulton-Doubleday syndicate, are given the right to light and heat the borough of Braddock, the Bessmer Steel-Works and the city of Pittsburg.

FLINT, MICH.—The Flint Gas-Light Company have contracted with the Coal and Oil Gas Company of New York for the necessary machinery and material to manufacture a combination of coal and water-gases.

GOVERNMENT WORK.

POST-OFFICE AND SUB-TREASURY EXTENSION, BOSTON, MASS.—Opened May 28. Synopsis of bids for glass, received under advertisement of May 14, 1884: R. Sherborn, amount, including duty, \$5,421.62, amount, less duty, \$3,262.49; Lambert Bros., \$5,348, \$3,148; Wm. Glenny & Co., \$2,964; Simon Bache & Co., \$5,800, \$3,500; Holbrook Bros., \$5,408; E. A. Boyd & Son, \$3,932.51, \$2,696.22; Hills, Turner & Co., \$5,639.75, \$3,534.75.

BUILDING FOR STATE, WAR, AND NAVY DEPARTMENTS, WASHINGTON, D. C.—Synopsis of bids for cast-iron water-pipe and extra heavy drain-pipe and fittings, opened May 29: Thomas Somerville & Sons, extra heavy hydrant-pipe and fittings, \$900; proof-pipe and fittings, \$171.60; cesspools, \$12.60; fish-traps, \$310; estimated total, \$1,394.20; McGill & Clark, \$411, \$147, \$13.92, \$389, \$960.92; J. L. Mott Iron-Works, \$1,000, \$150, \$12, \$1,162, exclusive of fish-traps.

PORT HURON, MICH.—The work on the new county jail to be erected here will be begun soon. The Board of Supervisors will meet here June 6 to make the necessary appropriation of \$15,000.

NEW CATALOGUE.

We have received a copy of the recently issued catalogue of the American Watch-Tool Co., illustrating the Whitcomb lathe.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
May 31.....	24.70	18.46	23.73	31.19	29.80	18.67

E. G. LOVE, Ph.D., *Gas Examiner.*

THE annual gas bill of the Houses of Parliament is about \$15,000.

AN electric-light company is being organized at Kalamazoo, Mich., to work under the Brush patents.

THE Boston Gas Company will reduce the price of gas to \$1.50 per 1,000 feet after July 1.

CHESTERFIELD, ENG., has given up electric-lighting and entered into a three years' contract with its gas company.

THE Albany, N. Y., Gas-Light Company will immediately build a large gas-holder. It will be ninety-six feet in diameter, and fifty feet high. The capacity will be 350,000 cubic feet.

AN application has just been made for a charter for a new lighting company for Philadelphia, the name of which is to be the National Illuminating Company of Philadelphia, and is to have a capital of \$200,000.

HARTFORD, CONN., Aldermen want more moon and less gas, and are discussing the propriety of giving the Street Board authority to extinguish the street-lamps on moonlight nights, or of shortening the hours of lighting, in order to bring the cost within the amount of the appropriation—viz., \$44,000.

THE Detroit, Mich., Board of Aldermen has contracted with the Brush Electric-Light Company to light the entire city, from July 1, 1884, to July 1, 1885, with seventy-two light-towers, having 300 lamps of 2,000 candle-power each, for \$95,000. The company erect and maintain the poles, wires, towers, etc.

THE bill to repeal the carbonic-oxide clause of the Massachusetts gas law has been defeated. It passed the Assembly by a large majority, and would have passed the Senate had not the presiding officer voted against it, thus making a tie vote. There seem to have been some remarkable conversions to the coal-gas interests during the consideration of the bill.

IT is stated that as the result of competition between the electric-light and gas in Boston, Mass., the price of gas has dropped from \$2 to \$1.30 per thousand cubic feet to the city, and from \$2.80 to \$1.80 to private consumers, and now the gas people are proposing to return to gas for street-lighting where electric-lamps have superseded the former, on the ground that gas is the more economical.

MAJOR PETER C. HAINS, of the Engineer Corps, U. S. A., has forwarded to Harbor Master Sutton a report by Assistant Engineer Dunklee, on the obstacles interposed by coal-tar deposits to the dredging of the Potomac River. He says that dredging at the foot of G Street has been seriously impeded by the deposit of gas-tar discharged from the Washington Gas-Works. The deposit was two feet in thickness in the crevices and around the sides of rocks. The divers cannot work until the accumulations are washed away by a jet of water, as the tar causes a painful swelling of the hands.

BRITISH NOTES.

E. C. BUCHANAN TUDOR, C. E., has presented to the Local Board of the Port of Goole, Yorkshire, a plan for disposing of the sewage.

IT is proposed erecting in the Glasgow, Scotland, district a lunatic asylum providing for from 800 to 1,000 patients. A committee of the Lunacy Board recommend the building of blocks for hospital purposes, accommodating from 250 to 300 patients, and having also accommodation in suitable-sized blocks, capable of ultimate extension for at least 600 patients, all the blocks being connected by corridors.

DR. FRANKLAND stated in his lecture on the 17th of March, that the daily quantity of water supplied to London amounted to 145,000,000 gallons, equal to 23,000,000 cubic feet, or an aggregate of 8,395,000,000 cubic feet in the year.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick stone; *b s dwell*, brown-stone dwelling; *apart house*, apartment-house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

95 Perry st, 5-story br ten and st; cost, \$16,500; o, Ernest Ohl; a, F. W. Klemt.
41 Great Jones, 5-story br st and ten; cost, \$18,000; o, Edw. C. Fiedler; a, J. M. Dunn.
232-4 Greenwich st, 5-st br st; cost, \$20,000; o, Laura V. Rhinelander, by Chas. E. Rhinelander; a, G. B. Post; b, not selected.
Hester st, s s, 26 w Ludlow st, 6-story br ten; cost, \$11,000; o, H. Waters; a, W. Graul.
Ludlow st, s w cor Hester st, 6-story br ten; cost, \$21,000; o, H. Waters; a, W. Graul.
83 Madison st, 5-story br ten; cost, \$20,000; o, Rosa White; a, J. M. Dunn; b, Grissler & Fausel.
179-83 Lewis st, 6-story br factory; cost, \$35,000; o, Simon Strauss; a, Chas. Kentz, Jr.; b, Peter Tostevin's Sons and F. A. Sieghardt.
4-10 Desbrosses st, 5-story br bldgs; total cost, \$12,000; o, S. V. R. Cruger, Comptroller of Trinity Church; b, L. H. Williams.
175-7 W. 12th st, 2 5-story br ten; cost, ea \$8,000; o, John E. D. Develin; a, C. F. Ridder, Jr.; b, R. Hayes.
214-6 E. 20th st, 2 5-story br ten; cost, each \$17,000; o and a, S. M. Styles.
426 W. 5th st, 5-story b s fr ten; cost, \$19,000; o, Chas. D. Shimer; a, E. B. W. Hays.
45th st, s s, 275 e 2d av, 2 5-story br ten and st; cost, each \$17,500; lessces, Lichtenstein Bros. & Co.; a, Schwarzmann & Buchmann.
313 E. 48th st, 5-story br ten; cost, \$18,000; o, Michael O'Keefe; a, Jos. M. Dunn; b, A. O. K. Horgan.
448 W. 33d st, 5-story b s ten; cost, \$16,000; o, James McDonald; a, N. L. Brun & Son; b, D. Kenny.
11th av, s e cor 38th st, 4 5-story br st and ten; cost, each \$15,000; o, David Stevenson, Jr.; a, J. M. Forster.
52d st, n s, 275 w 6th av, 3 3-story br and b s stables; cost, each \$10,000; o, Robert McCafferty; a and b, McCafferty & Buckley.
3d av, s w cor 98th st, 5-story br ten and st; cost, \$30,000; o, Ferdinand Boehm; a, John C. Burne; b, not selected.

BROOKLYN.

Willoughby av, s s, 120 e Nostrand av, 4 3-story and bmt b s dwells; cost, \$4,800 each; o, &c., Daniel B. Norris.
Rochester av, n e cor Atlantic av, 5 2-story and bmt fr dwells; cost, ea \$2,000; o, Frederick and John Dhuy; b, John Dhuy.
South 5th st, s s, 24 w 10th st, 4 3-story br tens; cost, ea \$3,424; o and carp, Wm. Kohlmeier; a, A. Herbert; mason, M. Smith.
Sands st, s e cor Jay st, 4-story br storehouse; cost, \$22,000; o, Alsgood, Rasch & Co.; a, C. F. Eisenach; b, Thos. Donlon and Long & Barnes.
3d av, s e cor 3d st, 2 4-story colored br engine-house and factory; cost, abt \$60,000; o, Somers Bros; a, D. M. Somers.
14-16 Locust st, s s, 125 e Broadway, 2 3-story fr tens; cost, ea \$4,900; o, Bernhard Mueller; a, Th. Engelhardt; b, Wm. Maske.
170 Hicks st, 3-story and bmt bldg; cost, \$5,000; o, William Van Blankenstein; a and b, Perkins & Green.

ALTERATIONS, NEW YORK CITY.

102-104 E 32d st, internal alterations; cost, \$10,000; o, Herts Bros.; a, M. C. Merritt.
43 E 30th st, 3-story br exten; cost, \$5,000; o, John Lindley; b, Samuel McMillan.
2 Bowling Green, 2-story br exten; cost, \$6,000; o, H. C.

ALTERATIONS, BROOKLYN.

1155 Fulton st, 3-story br exten; cost, \$7,000; o, Geo. Boemermann; a, George P. Chappell; b, Van Pelt & Pierce and Myron C. Rush.
BUFFALO, N. Y.—Main st, cor Delaware av, school building; cost, \$20,000; o, City; a, Beebe & Freeman. Addn to City water-works; cost, \$25,000; a, Beebe & Freeman.
Niagara st, cor Hudson st, br dwell; cost, \$10,500; o, J. Wood; a, Beebe & Freeman.

BOSTON, MASS.—1307 Tremont st, br ten and st; o, W. Caston; a and b, J. Hegan.
14 Fairfield st, 5-story br dwell; o, J. T. Morse, Jr.; a and b, S. H. L. Pierce.

CLEVELAND, O.—Pearl st cor Viaduct st, br block; cost, \$25,000; o, Elias Sims; b, James Phillips.
Eric st nr Superior st, br block; cost, \$25,000; o, W. H. Doan; b, L. G. Middaugh.

(Continued on page 20.)

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopoeial requirements. We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

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The following are among the subjects discussed in the Volume:

The Duties and Responsibilities of State and National Officers of Health, in a series of Editorials of much vigor.

Carefully-prepared Reviews of the Reports of State and Local Boards of Health, making one of the most complete records of the present condition of Sanitation in the United States and Great Britain which is accessible to the reader.

Mortality Statistics of the United States, presented in a weekly table very carefully compiled, with weekly notes on the health of the United States, Canada and Europe.

Vital Statistics.—Several valuable papers by Dr. J. S. Billings, on the computation of these Statistics.

Numerous important articles on the Adulteration of Food.

Improved Tenement-Houses as a Business Investment.—Illustrations of Buildings in New York and London.

The Public School-Houses of New York City.—An incisive, accurate series of Reports by Special Agents, with illustrations of the most extraordinary cases.

Cottage Hospitals.—The first numbers in a series of papers by Henry C. Burdett, of London, valuable to Physicians, Architects, and Sanitarians.

Lofty Buildings.—Their disadvantages. Two papers by Prof. R. Kerr, of Kings College, London, valuable in connection with the current discussion of that subject.

Public Baths and Wash-Houses.—The first of a series of papers on the Public Provision of Bathing Facilities in Cities.

Plumbing Apprenticeship.—A discussion by Master and Journeyman Plumbers.

Its more strictly Technical Articles contain, among others: *A History of American Water-Works Practice*, in its full Reviews of Reports of Water-Works Engineers and City Engineers. These are probably the fullest notice of this subject which is accessible. Comments on Notable Examples of Water-Work Construction at home and abroad. Reports on the Quaker Bridge Dam (New York Water-Supply), by B. S. Church, C. E., and Isaac Newton, C. E.

The Water-Supply of London.—A series of papers by an English Water-Works Engineer.

Notes on Sewerage Practice in the United States and Europe.

Original Data on the Memphis Sewerage.

A thorough Description of the New Main Sewerage System of Boston, Mass.—Elaborately illustrated. These articles, both text and illustrations, were prepared by one of the Engineers in charge of the work.

Illustrated Descriptions of the Plumbing, Heating, Lighting and Ventilation of Notable Buildings, showing the best modern practice. These include, among others, The Metropolitan Opera-House, Stables of Mr. Cornelius Vanderbilt, the Manhattan Storage Warehouse, the Russian and Turkish Baths in the Hoffman House, the Mutual Life Insurance Company's Building, and Bridgeport Hospital. These descriptions are prepared with great care, and are fully illustrated.

American Plumbing Practice.—By a New York Master Plumber.

English Plumbing Practice.—By an English Journeyman Plumber.

These papers show the practice of the trade in the two countries where plumbing is best developed.

The Steam-Fitting and Steam-Heating of Houses.—By a Practical Steam-Fitter, under the nom de plume "Thermus."

Gas and Electricity.—Processes of Gas Manufacture. The Vienna Electrical Exhibition is described, with illustrations, in the Special Correspondence of an American Electric Engineer.

Healthy Foundations for Houses.—A series of papers by Glenn Brown, Architect.

Correspondence.—Containing a great variety of inquiries and replies by the best obtainable authorities on Practical Questions, affecting House Construction, Plumbing, Water-Supply, Heating, Ventilation, Sewer Building, Reservoir Construction, etc.

American Patent Records and English Patent Records.—Containing Patents granted in the departments of manufacture affected by Sanitation in all its branches, Heating, Plumbing, Ventilation, etc.

Notes and Discussions on Current Topics of Interest.—Among these have been articles on the Cause of the Floods in the Ohio Valley, the Relation of Plumbers to State Medicine, Hints to Housekeepers on the Care of Mechanical Apparatus, Hygiene of Schools, etc.

Reports of Societies and Associations, Awards of Contracts, the Current Record of Buildings Projected, etc., are furnished by Special Correspondents.

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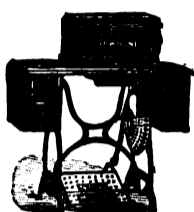
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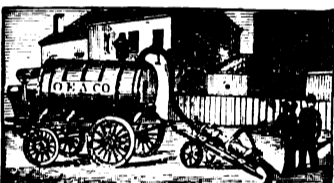
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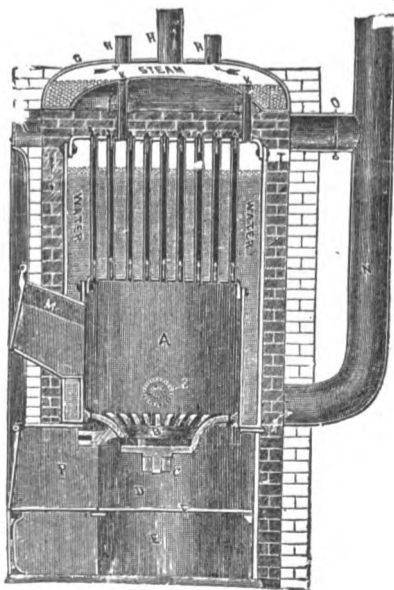
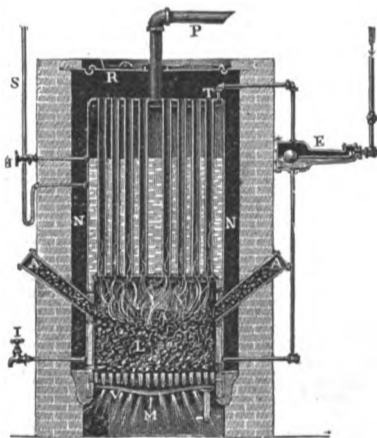
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THE SANITARY ENGINEER.

VOLUME 10.
NUMBER 2.

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RIGHTS OF TENANTS IN INSANITARY APARTMENTS.

AN interesting and instructive decision has recently been rendered by the General Term of the Court of Common Pleas in this city. The family of a tenant in one of the modern apartment-houses was taken ill from the malarial and poisonous gases which found entrance into their flat. This unhealthy condition was owing to the defective state of the *general plumbing* of the house.

The family physician, in searching for the causes of the illness, detected the presence of sewer-gas, and notified the Board of Health of this fact. An inspector of the board made an investigation, and reported to the landlord that his house was in an insanitary condition, and at the same time notified him of the particulars in which he should perfect its plumbing arrangements. The landlord neglected to comply with the requirements of the board in these particulars, and the tenant, being unwilling to risk the loss of the health of his family, abandoned the premises.

The landlord then sued for his rent, and the tenant defended upon the ground that he had been "constructively evicted" by reason of the insanitary condition of his apartments, through the neglect or omission of the landlord to perfect the general plumbing arrangements of the house, after notification by the Board of Health of its insanitary condition.

The court, by Chief Justice Daly, who wrote the opinion, which we elsewhere print in full, states as the law, that "*the tenant, as the occupant of a separate suite of apartments, was bound only to make such repairs in the plumbing therein as required no change in or was independent of the general plumbing-work of the house.*" And if by the wrongful neglect of the landlord to make necessary repairs to the *general* plumbing-work of the house the health of the tenant or his family is imperilled, the tenant is in effect deprived of the beneficial use of the premises, and may abandon them, and will be relieved from the further payment of rent. This is as sound sense as it is good law, and will undoubtedly in an indirect way accomplish much good in the cause of sanitary reform.

When the neglect to properly equip homes with safe and necessary sanitary appliances will result in the loss of rent, landlords will have the surest incentive to provide these requirements. Some landlords will make the sanitary condition of their houses perfect, whether it pays or not, but make it the policy most likely to yield profit, and no one will neglect these requirements.

CREMATION *versus* INTERMENT.

THE cremation of the body of the late Professor S. D. Gross, of Philadelphia, in accordance with his own directions to that effect, has had a tendency to increase the popularity of this mode of disposing of the dead, and we see that the proprietor of the crematory at Harrisburg announces that the demand for the services of his furnace is such that he can only undertake to supply it for the immediate vicinity. It is especially urged in favor of cremation that it is based on strictly scientific and sanitary principles, and that from the point of view of the hygienist it is greatly superior to interment. If this be quali-

fied by saying "interment as usually practiced," we would not contest the statement, but if we say "interment as it ought to be," the conclusion would be quite different.

It is claimed that the ultimate results of cremation and of inhumation are the same; that in each the disintegration is produced by oxidation, which in the first case is rapid and the second slow, but which in either case produces the same result; and that, therefore, in a scientific point of view, the rapid process is the best. This is, however, not a correct statement of the case. A dead body contains in its combined nitrogen an amount of stored force of a peculiar kind which is necessary to vegetable, and indirectly to animal life, and the quantity of which is limited. By the natural processes of decomposition in contact with earth, this force is preserved in the form of ammonia and other nitrogenous compounds, which, through the medium of plants, again enter the stream of life.

By the process of cremation this preservation of nitrogen in combinations useful for life occurs to a much less degree; there is a loss of force to the world, and, moreover, this loss is produced by the destruction of another part of the stored force available for human use—*i. e.*, of the world's stock of fuel. From the sanitary point of view, the present method of disposal of the dead, more especially among what are known as the upper classes, is no doubt very objectionable. This is mainly due to the use of metallic and air-tight coffins, or coffins of hard wood made close-fitting, though not actually air-tight, which tend to delay and modify the natural processes of decomposition. The slighter and less resisting the envelopes in which the body is placed the better, and probably nothing would give more satisfactory results than the wicker-basket lined with heather, or grasses, or flowers, proposed by Mr. Seymour Haden.

While the practice of burial in churches or in the midst of towns is now generally, and properly, condemned, careful investigation has failed to show that rural cemeteries, as managed in this country, are causes of offense or disease. That the water which has filtered through such cemeteries might be dangerous there is no doubt, but this is so generally understood that the risk from this cause must be exceedingly small.

The great danger of the dead to the living occurs before and not after their interment, and is connected with undue delay in removing the body to the cemetery, and with the gathering of people in a dangerous locality to attend funeral ceremonies, which in most cases it would be far better to omit altogether, since, even if they are not the means of diffusing infection, they are a heavy and entirely unnecessary tax upon the family.

There is some ground also for objecting to cremation as favoring the crime of poisoning by making it impossible to detect the results of such poisoning in cases where suspicion is not aroused until several days after death, which is frequently the case.

It will be seen that there are two sides to this matter, and that the question as to which method is most expedient is by no means so simple nor the answer so self-evident as some zealous advocates of cremation would have us suppose. We do not anticipate any speedy change in our present methods of disposing of our dead, but there is certainly room for improvement in the details

of the funeral and interment as ordinarily practiced, and it is upon these points that we think the efforts of sanitary reformers can be most wisely and usefully expended.

SANITARY PROGRESS IN NEW YORK STATE.

IN the three years and a half which have elapsed between the issuing of their first and second reports (the second is dated May 16, of this year), the New York Sanitary Reform Society has had the good fortune to see passed and in operation several laws of great sanitary importance, of which it has been one of the foremost advocates. One of the first measures urged by the society was the suppression of the Hunter's Point stench nuisances. The period between the two reports has seen the investigation by the New York State Board of Health, Governor Cornell's proclamation ordering the offensive works closed, under authority of a law passed expressly to deal with the nuisances, and the, in general, effective repressive measures which we noticed in our issue of March 13, 1884. In this line of work the nuisances in the Blissville cow-stables have been investigated, and will be reported on to the society. The street-cleaning agitation of the spring of 1881 was participated in by the society; it resulted in the legislation of that year, and in the formation of the Department of Street-Cleaning of the City of New York. The society, and especially its president, Mr. Gallatin, was an active supporter of the plumbing law for New York and Brooklyn, and has, since the passage of that measure, kept a watchful eye on attempts to impair its efficiency. From the Health Department the society has obtained the following statistics, showing the extent to which the law has already benefited the population of New York and Brooklyn:

	Houses.	Families.	Persons.
New York, private houses...	1,079	2,158	9,811
" tenements.....	2,685	26,580	119,610
Brooklyn.....	3,650	(No estimate.)	25,000
	7,414		154,421

It has also been a strong supporter of the New York City Board of Health in its operations against skim-milk; it has seen the value of and has advocated some most important practical measures, which public opinion in this community has recognized as needful and has put through.

THE DEPARTMENT OF PARKS AND MR. VAN WINKLE.

By the retirement of Mr. Edgar B. Van Winkle from the position of Chief Engineer of the Street and Sewer Department of the Department of Public Parks, the city of New York loses the services of a most competent and faithful officer. For the past six years Mr. Van Winkle has fulfilled the duties of an exceedingly arduous and responsible position in a most efficient manner, in the face of obstacles which can only be thoroughly appreciated by those who know the nature of the work, and the difficulty of doing anything under a four-headed commission of antagonistic politicians. The territory embraced in the jurisdiction of this department is as large as the original city to which it was annexed in 1874. The wise foresight of some of its prominent residents had caused a thorough topographical survey of the district to be made in advance of its annexation to the city, but under the supervision of the Park Department. The street system and the sewerage and drainage had to be established for these 13,000 acres of rugged and diversified territory, cut up into numerous irregular villages, each with its independent system of streets as laid out by the original owners of the tracts, and without grades established, pavements laid, or sewers built. Through this territory was scattered a population of 40,000 souls.

The task before the Park Department was to provide a system of streets and parks suitable to its future development, and not interfering too greatly with property divisions as to destroy the

value of the property and its existing improvements, to devise plans for its sewerage and drainage, and to carry them out as demanded, in a systematic manner, and to prepare maps showing accurately the boundaries, areas, and ownership of every separate parcel of property for purposes of assessment and taxation.

Between 1874 and 1878 the general scheme of laying out was determined on, the plans for the streets over about half of the area were prepared and adopted, the general system of sewerage planned for a limited area, and some sewers built. Mr. Van Winkle had been connected for two years with the development of the street and sewerage system, when in 1878 he was placed in charge of all the work, with reduced appropriations, a small force, and an ignorant and inharmonious commission. In spite of these obstacles he carried on the works with great efficiency, and has now completed the laying out of the territory on an admirably devised system, has constructed ten miles of sewers, graded five miles of streets, established by stone monuments the exact lines of over 100 miles of streets, and prepared for the tax commissioners maps of over 600 "blocks," besides a great amount of miscellaneous work not easily classified. The only complaint which can be made against the conduct of this work, is that the Chief Engineer has been so interested in his work that he has remained at his post in spite of the meagre appropriations made for its support, and to accomplish his purpose of completing the system, has consented to serve year after year for a compensation far less than is paid any similar grade of official in other branches of the Government. On the completion of the plans establishing the system of streets and parks, and a large portion of the sewerage, he voluntarily retires to take a well-earned rest from official duties, leaving a record for ability, industry, and integrity, which, it is to be hoped, his successor will emulate.

DELEGATES to the National Convention of Master Plumbers at Baltimore will find the letter of Mr. Byrne, in this issue, of interest. As the writer is one of the most active members of the New York association he undoubtedly expresses the feeling of the New York members for an Easterly location of the centre of the National Association, and we believe that the Western men will, on the whole, agree that they can best place their headquarters, for the present at least, in one of the Eastern cities. Mr. Byrne's letter places the matter fairly before them some weeks in advance of the time when it will have to be discussed and decided.

PROFESSOR CHANDLER, of Columbia College, late President of the Board of Health of New York City, and Dr. Woolsey Johnson, Commissioner of Health, sailed last week for England, where they will attend the International Health Exhibition at London, for which they are two of the local committee from New York.

THE Board of Health of Syracuse, N. Y., has issued a circular on the vaccination of school children, containing the following rules: Healthy infants should be vaccinated between the first and seventh months of life; vaccination of delicate infants may be delayed until the middle of the third year; children should be revaccinated during the fourteenth year; after severe illness persons should be revaccinated, and also when exposed or likely to be exposed to small-pox. Spring and autumn are the better seasons for vaccination. Pupils who do not comply with the requirements about vaccination in the public schools will be excluded from the same. All pupils and other persons who are too poor to employ a physician will be vaccinated free of charge at the City Hall during the months of May and September.

THE Legislative Committee on Labor of Massachusetts reported the following bill:

SECTION 1. Any person or corporation may employ any child under 14 years of age, provided such child is excused from attendance at school by the School Committee of the city or town wherein such child resides.

SEC. 2. Sections 1 and 2 of Chapter 48 of the Public Statutes, shall not apply to persons or corporations employing children so exempt.

OUR BRITISH CORRESPONDENCE.

Deptford Sewer—The Manchester Ship-Canal Bill—Exhibition of Wood-Work—Cable Tramway at Highgate—Institution of Civil Engineers.

LONDON, May 31, 1884.

ON Thursday of last week there was opened at Deptford one of the largest, if not the largest, sewer in England. It is intended for the overflow after heavy rains from the southern high-level sewer. It runs from Lee Bridge parallel to the Ravensbourne Valley down to the Thames near the Foreign Cattle Market, and has been executed at a cost of £34,000. It is built of hardened red brick embedded in a solid rectangular mass of concrete, and is twelve feet six inches in height by thirteen feet six inches in width. Its course follows the line of the streets, and is over 3,000 feet in length, the gradient being one in 564. On account of the diminishing slope of the foreshore the sewer at its outfall into the river branches into three smaller outlets. At its other end it is separated from the high-level sewer by iron sluice-gates, and there is a series of tumbling bays for its relief, if necessary, into a short lateral sewer. There is a small sewer, three feet by two feet, beneath the main sewer, which is intended for the drainage of houses of the locality through which it passes. After the *Cloaca Maxima* of Rome, which has been in existence now for upward of twenty-three centuries, the new sewer at Deptford is undoubtedly the biggest sewer in the world. The ancient *Cloaca Maxima* is about fourteen feet in height and width and is built, not like the Deptford sewer, of bricks, but of huge blocks of stone of a uniform length of five feet five inches and a width of three feet, laid without cement or mortar. It cannot be expected that the Deptford sewer will last as well as the ancient Roman one, although all the materials used in its construction have been the finest that could possibly be obtained.

The Select Committee of the House of Lords has passed the preamble of the Manchester Ship-Canal Bill, by which Manchester will virtually become a seaport. But the committee has added a proviso that the company which will be formed under the bill shall not begin to execute any work until shares for £5,000,000 are issued and subscribed for *bona fide* by persons who shall be certified as responsible for the amount of the capital. This, in effect, only means that half the capital for the construction of the canal shall be subscribed, and I understand that within three hours of the decision of the committee becoming known, all the stipulated amount was fully subscribed. The Manchester people take a great interest in the scheme and are greatly pleased at the result of the inquiry.

An interesting exhibition has been opened by the Lord Mayor during the past week at the new hall of the Carpenters' Company, London. It consists of works in woods executed for the most part by the hands of working carpenters, and includes many beautiful specimens of carving in architectural designs, foliage, and human figures. The number of private exhibits exceeds five hundred, contributed by one hundred and forty exhibitors.

Considerable interest has attended the opening of the cable tramway at Highgate, the first cable railway in Europe. The line is irregular and about a mile in length. Though in successful operation in the United States, cable tramways are a novelty here and excite interest accordingly.

The annual *Conversazione* of the Institution of Civil Engineers took place at South Kensington Museum last Thursday evening and was very numerously attended, there being more than two thousand ladies and gentlemen present, including among them most of the engineers of repute in this country, besides several distinguished foreign engineers at present visiting here. The whole of the ground floor of the museum was thrown open to the guests, as well as the picture galleries above. The whole of the rooms were brilliantly illuminated, some with gas and others with the electric-light, and profusely decorated with flowers and evergreens. The general effect was very pleasing. Excellent music was provided throughout the evening by the Hungarian Band and that of the Royal Engineers. The President, Sir Joseph Bazalgette, and the council are to be congratulated on the success which attended their efforts to afford a pleasant evening to their numerous guests.

SAFETY-VALVE.

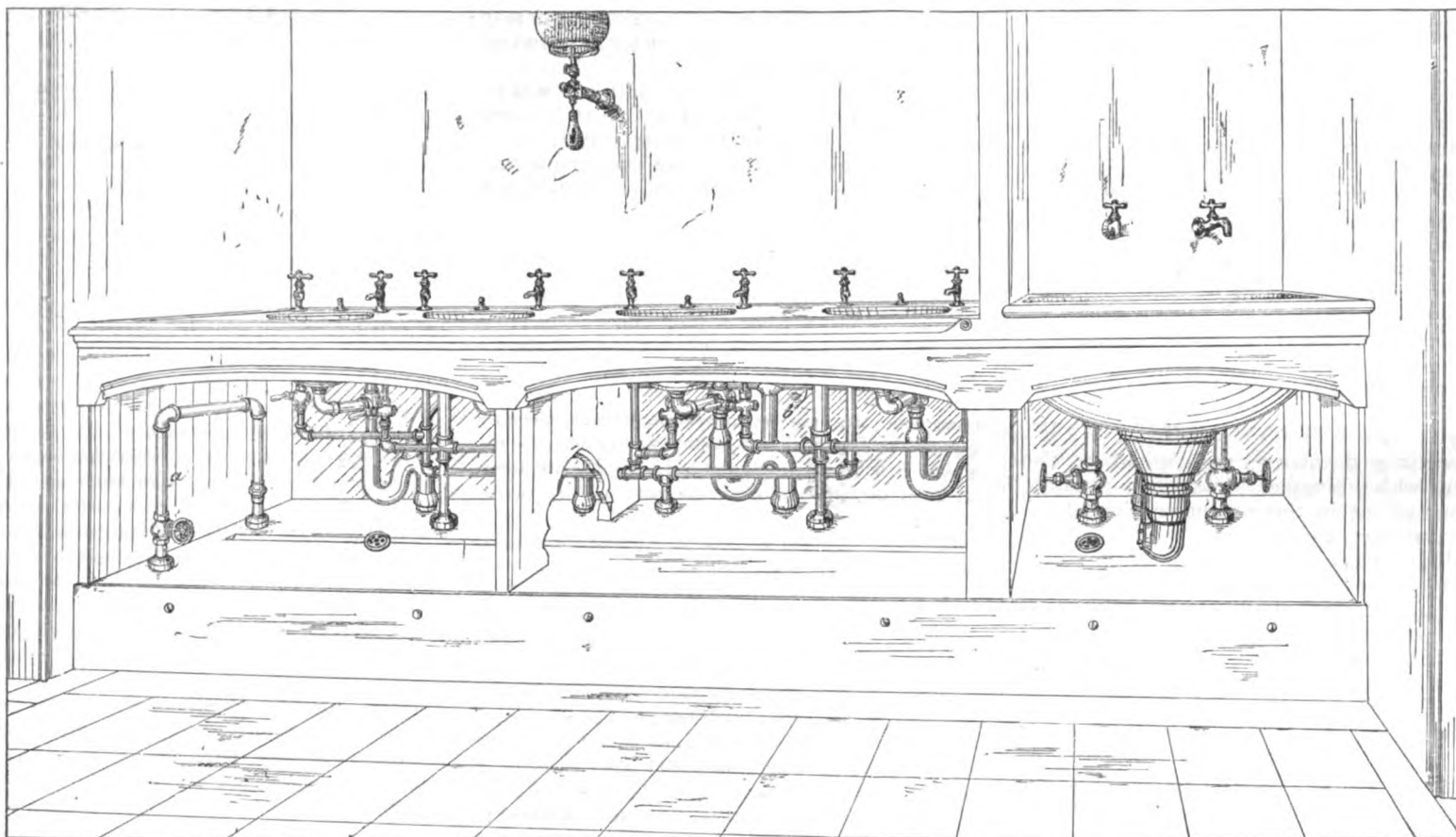


FIGURE 6.

HOSPITAL AND PRISON VISITATION.

THE visit of ladies of St. Elizabeth Guild of this city, to the hospitals and lunatic asylum on Hart's Island last week, may serve as the occasion of reminding our readers of the fine work which this organization is doing among the miserable and the outcast of the great city. The Guild was organized some years since, by ladies of New York, for work in the penitentiaries, almshouses, and hospitals of this vicinity, by personal visitation. We believe they go weekly to Blackwell's Island, and at regular times to the other institution islands near Manhattan, distributing clothing and other articles, and seeking to improve the lives of the wretched inmates. Working, as these visitors do, among some of the most degraded and vicious, requires no little self denial. The public can recognize this in some degree by contributions of clothing and delicacies for the sick for use in their work. All such articles should be addressed to the Guild of St. Elizabeth, care of Rev. W. G. French, Charity Hospital, Blackwell's Island.

The officers of the Guild are: President, Mrs. S. B. Nelson; Vice-Presidents, Miss Ellen Kemble, Mrs. W. H. Ensign; Secretary, Miss Kate Comstock; Treasurer, Mrs. B. De Peyster.

THE Administration of Public Works in Paris has published a report of its expenditure for the ten years between 1872 and 1881, the total being £26,160,000, of which £15,920,000 has been for new works and the remainder for maintenance and repairs. Out of the £15,920,000 spent upon new works, £9,200,000 was for making new streets and other public roads, £1,880,000 for water and sewers, £120,000 for lighting, £280,000 for public gardens, and £4,400,000 for public buildings. Out of the £10,240,000 spent upon repairs and maintenance, £5,560,000 was for keeping the roads and pavements in order, £3,120,000 for lighting, £800,000 for public buildings, £320,000 for water and sewers, and £120,000 for the public gardens. The total length of the streets opened or widened since 1872 is about sixteen miles.—*London Engineer*.

At a meeting of the Association of Municipal and Sanitary Engineers at Ealing, Eng., May 24, Mr. C. Jones, the engineer to the local board, gave an account of the remarkable rise and prosperity of Ealing. The sanitary arrangements are admirable. The sewage works were the earliest commenced in the Thames Valley, and have been extended with the increase of population. That increase has been from 5,000 in 1869 to 18,369 persons now; and the ratable value of property has risen correspondingly in the time from £21,500 to £118,071. The influence of the progress made in the sanitary arrangements is indicated by the diminished death-rates, which have decreased from 18.26 in 1875 to 11.23 per 1,000 in the past year.

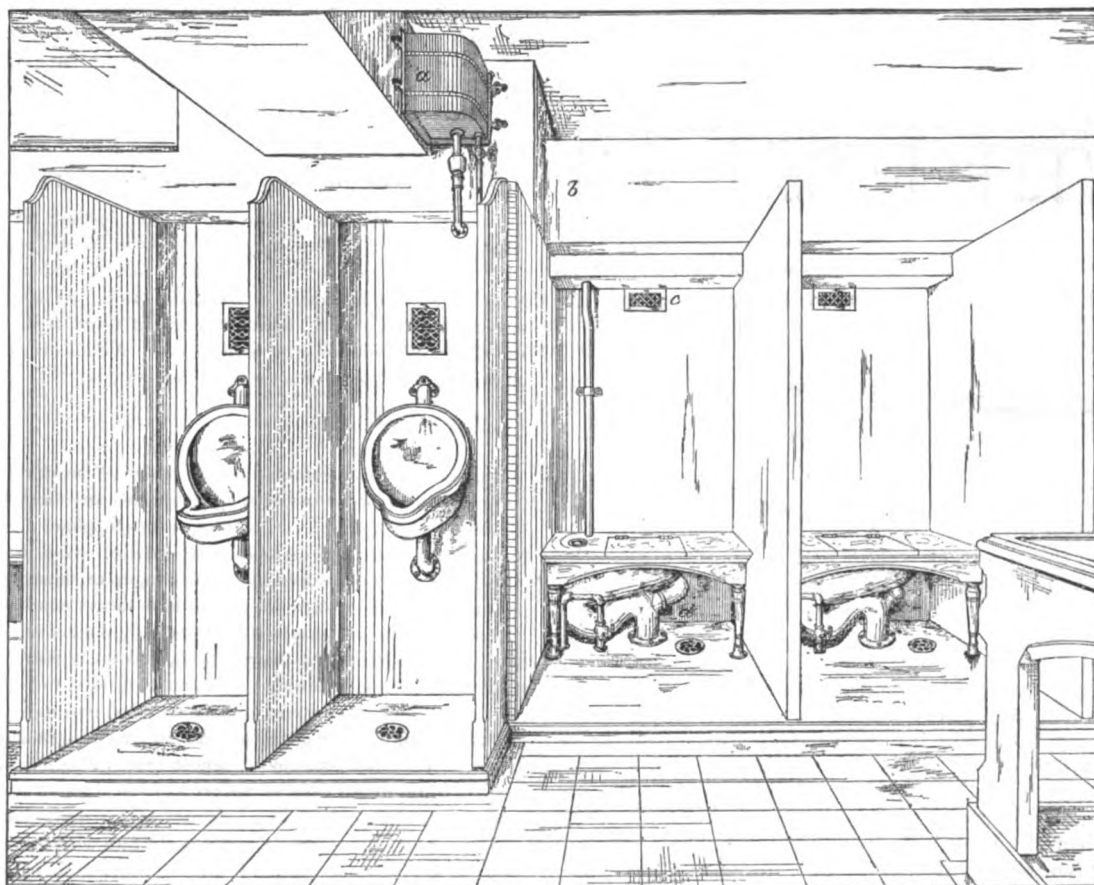


FIGURE 5.

PLUMBING FIXTURES IN THE MUTUAL LIFE INSURANCE COMPANY'S BUILDING.

THE MUTUAL LIFE INSURANCE COMPANY'S NEW BUILDING IN NEW YORK CITY.

No. III.

(Continued from page 610, Volume IX.)

In our issue of February 7, page 234, we illustrated some details of what is generally termed the "rough work"—i. e., soil-pipes, vents, traps, etc.—of this building.

The "rough work" is usually hidden from sight when the building is completed and the fixtures set, and in this case proves to be entirely covered with marble. The number of water-closet fixtures within the building is about 125, the posi-

tions of many of which are shown on the plans, pages 590 and 591, Vol. IX., but the six for which Fig. 1 (page 234) is a detail, are situated in the entresol story near Z. Fig. 5 here shown is a detail at Z, when the work was completed, showing the two urinals which are against the pier and the first two closets at the right of them. The closets are valve-closets, flushed from a cistern *b*, which supplies water to all the closets in the row. The urinals are flushed by automatically-discharged cisterns, one of which is shown at *a*, Fig. 5, and which supplies water to the two urinals shown. Where as many as six urinals are in a row, one large cistern of this kind flushes them all through a series of pipes arranged as in Fig. 2, at F,

"rough work," page 234, February 7, the order and sizes being arranged with a view to flushing all the urinals alike. The heels of all the traps under the urinal-safes are also provided with a flushing-pipe of one-half inch in diameter, which for each set of urinals is connected with a pipe of larger diameter, to which a hand flushing-valve is attached for the purpose of flushing and renewing the water in these traps.

The ventilation of these closets and urinal-stalls, which was before alluded to, is here shown. C is the upper register and *d* is the opening into the same flue under the seat. Fig. 7 is a horizontal section of the walls above the seats at the end of this row of closets on the right, and shows the detail of the double wall and its connection with the aspirating-flue around the main smoke-chimney.

The registers shown over each urinal are also connected with this space. The partitions, walls, floors, and all within these rooms not metal, except the ceilings, are heavy white marble, fitted and held in place with round-headed plated screws, to facilitate removal. Fig. 6 is a detail of the finished work at Y, second-story plan, showing the four wash-bowls and a slop-sink. No wood is used in the finishing here, all being marble of heavy design, leaving all the pipes exposed. The pipe *a* is the cold-water supply to these basins, and is brought up in the manner shown, so as to have the stop-valve above the marble safe. All the exposed pipes are brass, except the lead traps and back-air pipes *b*, which are 8-pound lead. In other respects the diagram speaks for itself, and was particularly introduced to show the design of the marble-work, which is carried out throughout the building.

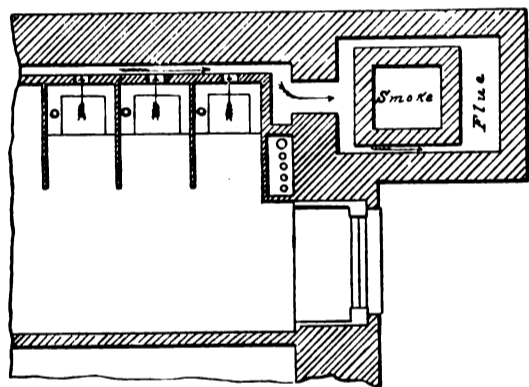


FIG. 7.

Water for flushing purposes is intended to be taken from an artesian-well which has been sunk on the premises. The well is 709 feet deep, in which the water rises to within 200 feet of the top of the ground, from which depth it is elevated by one of "Knowles'" deep-well pumps, the supply being about 30 gallons per minute. From the pump the water passes to one of two iron tanks, each 5 feet wide by 15 feet long by 6 feet deep, from which it is forced to the house-tanks by one of "Worthington's" duplex pumps, with steam cylinders $7\frac{1}{2} \times 10$ stroke, with $4\frac{1}{2}$ -inch water-plungers. The other receiving-tank is for Croton water, to which is attached one of "Knowles'" duplex pumps, 6-inch steam cylinders, 7-inch diameter, with 4-inch water-pistons, for forcing the water to the top of the house for general purposes. These pumps are so connected that either can be used for the purpose of the other should one be out of order.

In addition to the pumps already mentioned is a Claffin & Jones stationary steam fire-engine. It is a duplex pump, with 16-inch steam cylinders by 9-inch stroke, with $7\frac{1}{2}$ -inch water pistons. The suction-pipe from the tanks is 8 inches in diameter and the delivery 6 inches, which is divided into two 3-inch fire lines, which extend through the building, terminating in tanks at the roof, but so arranged that water from the pumps cannot pass into the tank, but with provision for the water from the tanks to pass into the lines by gravity through swinging check-valves, that an immediate supply may be had from the tanks upon the opening of a nozzle, after which, when

the pumps are started, an increased pressure may be obtained by not allowing the water to be forced back again into the tanks.

Steam for power and heating purposes will be furnished by four of "Babcock & Wilcox" boilers of a nominal capacity of 480 horse-power.

An illustration of the house tank-room and tanks, with their connections, will be given in our next issue.

ÆSTHETICS AND PLUMBING AT HOME.

THE Women's Educational and Industrial Union, of Buffalo, N. Y., devoted one of their Friday afternoons a week or two since to houses and plumbing, and heard a paper on "The Sanitary Drainage of our Homes," by Mrs. George Howard Lewis. Mrs. Lewis, as Mrs. Hooker and Mrs. Plunkett have done, finds it necessary right at the beginning to point out that not only the æsthetic, but the practical side of house life deserves attention from women, and what she says is well worth quoting:

"In building a house we think too much of the architectural beauties, the display of choice woods, the adornment of the fresco-painter's brush, and we give no thought to the plumber's work, except as we demand a bath-room and a convenient basin in each dressing-room. We give up our time and attention to the adornment of our house, the plush and silk hangings, the choice rugs, the expensive upholstery, the fascinating bric-a-brac, but the cellar is beneath our notice, and the ventilation of our rooms, the arrangement of our drains, the size of pipes and kind of traps are all too abstruse subjects. We really have not time to attend to them. So the sanitary part is left entirely to the too æsthetic architect, and the ignorant and often dishonest plumber. After we settle down in our new homes, prepared to enjoy all we have gathered about us, we soon find there is something wrong. It is not the fresco, that still delights the eye; it is not the hangings, their coloring remains the same, for have we not carefully guarded them from the sun's rays?—too carefully for our own good; it is not the furniture, for as yet there are no cracks in it. What is wrong? We are constantly suffering from headaches; our little ones are taken with chills, and complain of an ache here, or a bad feeling there. Some one hints that there may be a defect in the drainage. Oh, no! that cannot be. We have had a first-class plumber, and we have paid a first-class price. At length serious illnesses occur, diphtheria, scarlet fever, typhoid, and then we decide we must investigate. We uncover the pipes, and a test soon tells the story—sewer gas."

DISINFECTANTS.

ON the use of disinfectants, the *Lancet* says: "No drain in proper working order ought to give rise to any nuisance whatever. Excepting cases of temporary stoppage, disinfectants are at best but of momentary service. If a drain leaks, or is otherwise defective, the danger of sewer-gas poisoning, though always present, is not always manifest. Bad smells arise but occasionally, then only the household take alarm, disinfectants are procured, and the nuisance is apparently at once removed. As a matter of fact, the only result is to engender a sense of false security, and to mask the danger for a few days, instead of removing it altogether. We would therefore suggest that, though disinfectants ought in no case to be refused, their distribution should at once be followed by a domiciliary visit. The demand for disinfectants might serve to indicate where domiciliary visits should be paid. By this simple means innumerable cases of defective drainage would be discovered, especially in middle-class houses. Such activity might require additions to the sanitary staff, but for so good a purpose no objection need be raised to the extra expense. As matters now stand, however, it is a question whether the indiscriminate distribution of disinfectants, without subsequent inquiry, does not do more harm than good. But for the facilities of obtaining these disinfectants there are many cases in which the house-drains would be dug up, repaired, and properly relaid."

THE New York County Medical Society has resolved that the medical and sanitary administration of ocean steamships is unreliable, and often far from satisfactory. Many lives are needlessly sacrificed, and foreign infection is freely imported to this country in consequence. The society urges the necessity of legislation to protect the general health.

HEALTHY FOUNDATIONS.

No. VIII.

BY GLENN BROWN, ARCHITECT.

"He who builds a fair house upon an ill seat committeth himself to prison."—BACON, vol. i., page 40.

(Continued from Vol. IX., page 572.)

FOUNDATION-WALLS.

A Foundation in Marshy Ground.—Where a marsh is of any depth it is necessary, in the first place, to drive piles down until they rest upon or are driven into a solid or compact stratum, the heads of the piles being held in position by cross planks spiked or bolted to them. The whole should then be floored over with plank three or four inches thick (Fig. 31). Across this flooring, and over the line of the piles, long footing-stones may be placed. The wall, with its usual footing, is built above this course of stone. On the top of the first course of stone, and at least a foot above the flooring or woodwork, a line of two or three-inch drain-tile is placed against the footings both inside and outside of the wall. Against the face of the wall on the outside shaped terra-cotta pieces are so arranged as to make, practically, a hollow wall. It is necessary to have openings in these terra-cotta tile or guards (Fig. 31). Any water that passes through the open stone or intercepting-drain will pass through the openings left for the purpose, down the side of the guards into and off through the drain. These drains will keep the water below the cellar bottom, at the same time maintaining the water-level at least a foot above the wooden portion of the foundation. Wood submerged in water, the air never being allowed to come in contact with it, is practically imperishable.

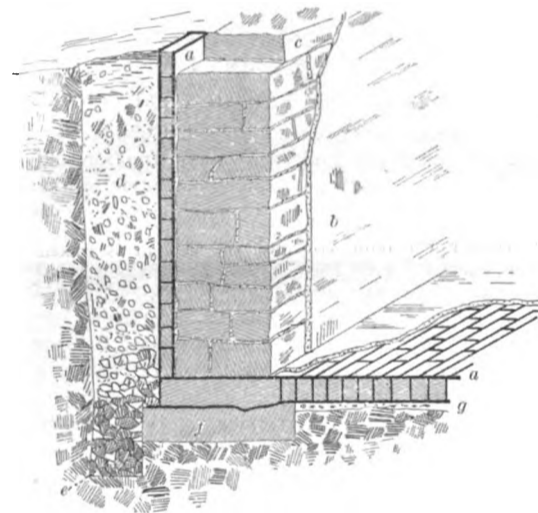


FIG. 32.—POROUS-STONE WALLS.

a, Brick laid in asphalt; c, wall; d, plaster; e, filling; f, drain; g, footing.

A vitrified terra-cotta or stoneware shed is built into the wall above the guards to prevent water running down the side of the wall. The cellar bottom should then be covered with boards, if the marshy character of the ground makes it necessary, filled eight or ten inches with broken stone, and concreted above. The concrete should be coated with asphalt, and the asphalt should be carried up the inside face of the wall, over a coating of cement plastered over the stone to make an even surface.

Footings.—After the trenches have been excavated six or eight inches wider inside and outside the building than the wall above, and a solid bottom has been reached a foot or eighteen inches below the cellar floor, then the footing or first course or courses of the foundation-wall are laid in these trenches.

The footings may be made from large stone selected for the purpose, long and wide, or courses of brick are laid wider than the wall above, the number of courses and the width varying according to the superimposed structure (Fig. 28). The course of brick in the bottom of the trenches being the widest, each course above is narrower for from five to eight courses, until the width of the wall is reached. The footing may be made by filling the trench with broken stone rammed dry into place (Fig. 29). The broken stone, in this case, forms an excellent drain encircling the building beneath the foundation walls. When there is a possibility of water collecting to a noticeable extent, these footings should have an outlet through either a stone or a tile-drain to some low point, or should be connected with the sewer, as described in article No. V., *SANITARY ENGINEER*, March 27, 1884.

From fear of settlements, some architects prefer to put their stone or concrete footings directly upon the solid bottom, and have the drain formed of broken stone, or tile on the side instead of beneath the footing (Fig. 32). Footing-stones, unless they are intended to act as drains, should be impervious, of good material, and have even beds. The trench should be hollowed out to receive any inequalities. If the stone does not set firmly, it should be rammed down to a solid bearing, or, as Prof. T. M. Clark advises, sand may be packed around it, and when buckets of water are thrown on the sand it will be carried under the stone and fill all the crevices, and thus give the stone a solid bearing. Footings may be bedded solid in a thick layer of soft mortar with excellent effect.

On made or other ground, where the natural foundation is poor, concrete footings may be put in extending over a large enough surface to carry the weight which is to be imposed. Very little dampness will pass through good concrete foundations. And it is a good practice to make the footings and cellar bottom one continuous piece of concrete.

Cement.—The quality of cement is the most important item in making concrete for footings or cellar floors, or in making mortar for jointing or plastering the face of the wall.

The architect has generally to rely on well known and reputable brands. Care must be taken to see that they have not been spoiled by water or dampness.

To test cement in a rough way, as Prof. Clark suggests, mix it with water, and make small cakes, which are put away to dry until they are so dry that a small square stick weighted by a brick will make only a slight impression upon it. These cakes are immersed in water and another set is made and left in the air.

After a lapse of twenty-four hours the piece left in the air should be hard and should break with a clean fracture instead of crumbling, while the cake left in the water should retain its shape and have increased in firmness. Machines are sometimes used for testing cement, the Government and private civil engineers making use of them in large works. Such machines are found necessary in order to prevent fraud and accidents in important works.

Concrete.—For making concrete, the cement is mixed with two parts of clean, sharp sand, until neither a lump of cement nor patches of sand can be seen in the mass.

The mortar is call the matrix, while the broken stone or brick, gravel, bits of burnt clay, iron slag, or breeze, is called the aggregate. Enough water is mixed with the sand and cement to give it a pudding-like consistency. The aggregate must be wetted to wash off the light dust that

might settle on it and prevent the matrix from adhering. In some instances the materials are mixed together separately and in a dry state, and then the whole mass is sprinkled with water.

When mixed in the proportion of one of cement, two of sand, five of broken stone or ballast, the concrete is wheeled to the desired point and dumped from the height of two or three feet and quickly rammed.

It is a mistaken idea that concrete should be thrown from an elevation of ten or twelve feet, as the large and heavy stones reach the bed first and the small ones remain at the top.

Concrete should never be laid more than twelve inches thick in one layer. When the first layer has hardened, it must be brushed off clean, wetted and roughed up with a pick, when the second layer may be added. When laid in water concrete can be laid in coarse cotton bags. The bag remains; or it may be deposited through shoots.

Porous-Stone Walls.—Figs. 32 and 33 illustrate methods of treating porous-stone walls. Fig. 32 shows the outside faced with brick laid in asphalt; the asphalt continues through the wall and forms a damp-proof course, while the cellar floor is paved with brick laid in asphalt.

Fig. 33 shows a double wall, in which the interior wall is built of brick. An air-space between the two walls prevents dampness from passing into the rooms.

The underpinning or part of the foundation-wall which is above ground should overhang the wall below, so that water which trickles down the face of the wall, instead of continuing its course along the wall, will run off into the earth or loose filling next to the foundation.

The manner of treating brick walls will answer equally well for stone walls that would absorb water.

(TO BE CONTINUED.)

MRS. ELIZABETH CADY STANTON believes that if women would use their influence toward cleanliness, we could have our streets and cars as clean as our parlors. "It would be very easy to dispose of the papers in the streets if each man would collect his own in a pile and put a match to them, and the boys would be only too happy to serve us in that direction. Perhaps it would be a good idea to organize a police of boys to collect in piles and burn everything that should not be seen in the streets. Dividing the town into districts, and making an officer of the most reliable boy in each district, paying him a small sum, there is no doubt that much could be accomplished in improving the character of our boys, as well as the streets. Let the women and children come together and organize some plans for village improvements in this country."

THE National Smoke-Abatement Institution, of London, is making arrangements with the Parkes Museum of Hygiene to provide space in the museum for an exhibition of heating, cooking, and smoke-abating appliances. The heating apparatus will be selected with the special view of showing typical kinds of apparatus and illustrating systems of economizing fuel and abating smoke. No charge will be made to the persons whose articles are exhibited. Persons having specimens of apparatus, diagrams, models, statistical matter, or other articles suited to the collection—or new inventions which they desire to bring to the notice of the council, are requested to communicate with Mr. E. White Wallis, Secretary to the National Smoke-Abatement Institution, at the offices of the institution, which are now to be removed to the Parkes Museum, Margaret Street, Regent Street, W.

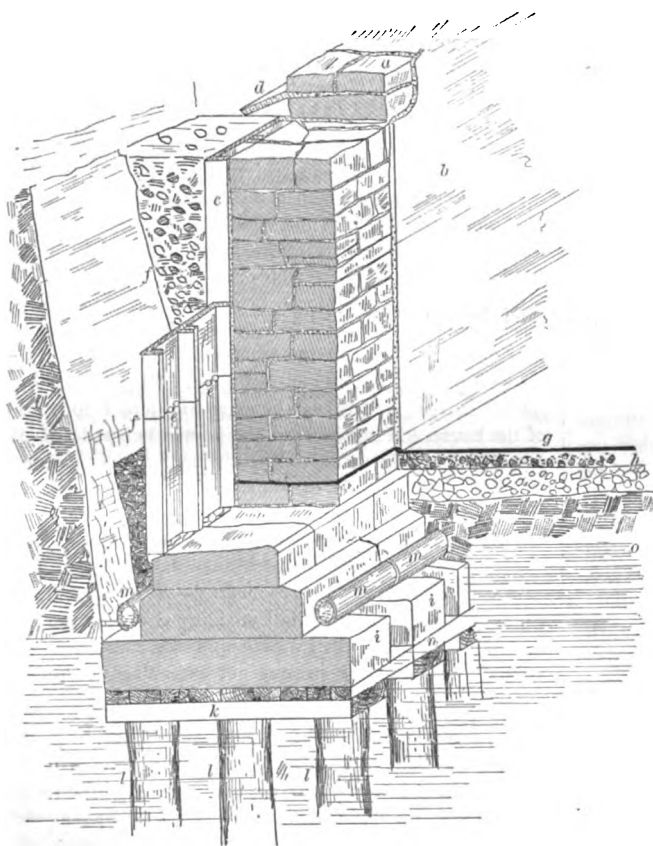


FIGURE 31.

a, Wall; b, cement-plaster; c, Guards' terrace; d, shed; e, water-inlet; f, broken-stone filling; g, asphalt coating and damp-proof course; h, concrete; i, footing-stone; k, ties; l, piles; m, drain-tile; n, plank; o, marshy ground.

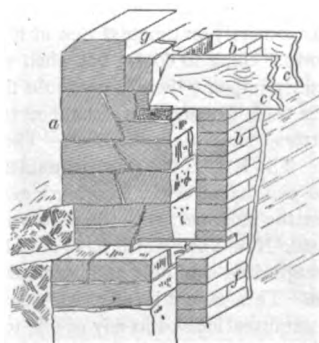


FIG. 33.—DOUBLE WALL.

a, Stone wall; b, brick wall; c, joist; d, projecting underpinning; e, iron tie.

PROPOSED RULES FOR HOUSE-DRAINAGE AND PLUMBING FOR PARIS.

A CORRESPONDENT sends us the text of the proposed law governing the plumbing and drainage-work of the houses of Paris.

CHAPTER I.—WATER-CLOSETS.

1. In every house to be hereafter built there must be one water-closet for each tenement of at least two rooms, or for each series of from two to six rooms let separately. In the first case the water-closet can be outside of the tenement as long as it is on the same floor. In the second instance it must also be on the same floor, and divided by partitions into as many sections as there are tenements, so that each tenant may have the exclusive use of one of these sections.

2. Each water-closet must have a reservoir or connection with the water-main, so that it may have a supply of at least 10 litres (2½ gallons) per day per person.

3. The water-supply must be furnished to the bowl in such a way as to furnish a sufficient wash and force. The distributing apparatus must be examined and accepted by the Sanitary Service of Paris before being put in use.

4. Every water-closet bowl must have a water-seal.

5. Articles 2, 3 and 4 apply to closets for shops, offices, and workrooms for men and women, and in fact all establishments where a large population is accumulated during the day.

CHAPTER II.—SINK AND RAIN WATERS.

6. All sink and other drains shall have a syphon or other water-trap at their upper end.

7. All rain-water conductors shall be disconnected from the sewers by some interrupting apparatus.

CHAPTER III.—SOIL AND DRAIN-PIPES.

8. Drains, rain-water conductors and soil-pipes will remain subject to the present regulations; but their diameter cannot be less than 0 m. 11 (4½ inches), or over 0 m. 16 (6½ inches), according to the importance of the water-closets, kitchens or roofs connected therewith.

9. Soil-pipe connections to water-closets cannot be made at an angle of over 45°. Every vertical pipe shall be continued above the roof and left open.

10. The introduction of all solid bodies, broken crockery, kitchen refuse, etc., in drains and rain-water conductors is forbidden.

11. All lateral drains in cellars and courts from the foot of soil or drain-pipes must be formed of straight sections and curved pipes of large radius; at every change of direction or grade there must be a branch for ventilation and clearing out.

CHAPTER IV.—OUTLET FOR SOIL AND WASTE MATTERS AND RAIN-WATER.

12. Wherever the house-drain can empty directly into the public sewer, the soil and rain-water pipes shall be connected directly with it.

13. The minimum fall for these outlet-drains is 0 m. 03 per meter (3:100). Where this fall cannot be obtained the administration reserves the right to allow a less fall with flushing-tanks or other contrivance, to be set at the expense of the owners.

14. The diameter of this outlet-drain shall be regulated by the fall and the flow, but must never be less than 0 m. 16 (6½ inches).

15. Every outlet-drain shall have, before leaving the premises, a syphon or other water-trap forming a permanent and hermetic disconnection from the sewer. Samples of this apparatus must be submitted and accepted by the administration. Each syphon shall have an inspection branch with automatic gate on the house side of trap.

16. The outlet-drain and trap shall be of stoneware, glazed inside. The joints must be tight, and made with care to withstand any back pressure from the sewer, and have no projections on the inside. Cast-iron pipe may be allowed by the administration.

17. The outlet-drains shall be carried through the passageway from house to sewer clear to the public sewer.

18. In streets and public ways where the drains cannot empty directly into the sewer, special rules, made with the advice of the municipal council, will prescribe the arrangements to be adopted for connecting soil and rain-water pipes with the special ducts to be built for this purpose.

19. In all new buildings the passageway from house to sewer must communicate with the interior of the house, and be closed by a wall on the sewer end.

In the old houses owners will be allowed to make connections between the house and passageway, and have a trap, water-meter, etc., in the passageway, on condition of closing up sewer entrance to passageway.

CHAPTER V.—TIME FOR EXECUTING THE WORK.

20. Prefectoral decrees, with advice of the municipal council, will indicate the public streets in which the connections can be made directly with the sewer, or with special conduits.

21. Article I, in reference to the number of water-closets, will be immediately applicable to new buildings, and may be rendered applicable to old buildings if health requires it, in accordance with the law of April 13, 1850, on unhealthy dwellings. The other articles of Chapter I. will only be applied in the streets indicated by prefectoral decrees referred to in the preceding article. The owners will have three years from the publication of the ordinances to apply articles 2, 3 and 4 of Chapter I., and see to the carrying out of the regulations in Chapters II., III. and IV. as to traps and outlet-drains, in accordance with the present rules. After this time the work will be executed by the authorities, and the cost charged to the owners.

22. Within one year from the publication of these rules, all soil-pipes must be extended to the roof, as is at present required for the vent-pipes, and without injury to these latter pipes.

23. Plans for piping new houses or altering old houses must be submitted for approval to the Service of Sanitation of Paris.

They must contain details of all the work to be done, as well for the water-supply as for the water-closets, soil, waste and rain-water pipes. After approval and completion the work must be examined and accepted by the Service of Sanitation of Paris, assisted by the supervising architects, who will see that the work conforms to the plans and rules.

CHAPTER VI.—CHARGES.

24. In conformity with the law dated , the proprietors will pay, for clearing and maintaining the sewers and special conduits after the suppression of the fixed vaults (cesspools), a tax composed of a fixed charge of 30 francs (\$6) per soil-pipe, and a proportional charge equal to one per cent. of the rental value of the whole property. This tax can be revised every five years after deliberation of the municipal council.

CHAPTER VII.—TEMPORARY REGULATIONS.

25. No more permits will be issued for running sewage matters into the sewer through filtering-tanks, according to the ordinance of July 2, 1867, unless the owner arranges his apparatus and pipes so as to be able to run the whole into the sewer or special conduit as soon as one or the other of these methods will be practicable.

26. In buildings supplied with filtering-tanks there will be a general inspection. All tanks not arranged so as to render impossible an overflow into the vault, and which have not a direct overflow into the sewer, will have to be replaced at the expense of owners within six months from the time the owner is notified.

27. New fixed vaults will only be sanctioned in cases, to be determined by the administration, where the absence of sewers, the dispositions of the public sewer or water-mains, or any other cause, would not permit of the direct flow of sewage into the sewer or special public conduit.

28. In all present vaults, at the first emptying, the lowest part of the bottom must be dished out at least 0 m.30 (11.8 inches) deep below the emptying vent, to facilitate the alterations.

29. All present ordinances with reference to vaults, filtering-tanks, soil and vent-pipes which do not conflict with the new rules remain in force.

PROPOSED LAW AUTHORIZING THE CITY OF PARIS TO COLLECT A MUNICIPAL TAX FOR REMOVING SEWAGE.

ARTICLE I.—The city of Paris is authorized to collect a municipal tax for removing liquid and solid sewage.

ART. II.—This obligatory municipal tax will be paid according to a tariff divided into two parts, the first proportional to the number of soil-pipes; the second proportional to the rental value of the property. This tariff, settled in the municipal council and approved by a decree rendered in the form of public administration regulations, can be revised every five years.

ART. III.—The collecting of this tax will be the same as for direct taxes.

ART. IV.—Every proprietor is assumed to have on each story a water-faucet for the use of tenants who have not a supply in their apartment. He is also assumed to place in each water-closet a supply of water for cleaning soil-pipe, delivering at least ten litres (2½ gallons) per 24 hours per person using the closet.

[We are glad to see by these "rules" that the authorities of Paris have awakened to the need of supplying water to water-closets. The scarcity of water for domestic wants in that city has been so great, when considered by American, or even the more moderate English standards, that it is not many years since the "water-closet," so called, could be easily found in most French lodging-houses by any stranger who sought that convenience, simply by following his nose. The use of water has not been a visible part of the routine of their use, and it has been a source of doubt to the writer in more than one case whether any water at all was applied oftener than a little rinsing once or twice a week by the *Concierge*.

The use of cesspools in Paris has heretofore been a part of the established custom, and the exclusion of faecal matter from the sewers has been insisted on until very recently.

From one point of view it is hard to see how a water-closet can be made tolerable if allowed only 2½ gallons of water daily for each person, but this quantity is such a decided advance upon their former methods that it probably appears ample. There seems to be no requirement for the use of iron or other metallic pipes for soil-pipes and drains inside the house-walls, and the old-fashioned earthenware-pipes are probably still in use, as of old, being often built into the angles of the walls in vertical stacks for several stories in height.

It is an advance upon this practice that we find cast-iron allowed (in Art. 16). It would appear from Art. 19 that the whole length of the drain from the house to the sewer is made accessible by being constructed in a "passage-way" walled up at the end at the sewer, which is certainly an advantage, rendering the detection and repair of leaks in the branch-drain a comparatively easy matter.

We are also glad to see that these rules include the "hermetic disconnection" of the house-drain from the sewer (Art. 15).

The rules are very lenient in regard to the introduction of water to water-closets in old buildings, allowing three years' time even when required at all by the prefecture.—ED. SAN. ENG.]

Correspondence.

THE LOCATION OF THE MASTER PLUMBERS' NATIONAL ASSOCIATION.

To the Editor of THE SANITARY ENGINEER :

THE near approach of the National Convention of Master Plumbers of the United States suggests a topic which, so far as I can learn, has not been touched upon in any published communication in your columns. I refer to the location of the Executive Department of the National Association for the coming year, the importance of which question you will, I dare say, readily concede at the present moment.

At our first convention the propriety of having New York the pivotal point was readily acknowledged. Here were located a large majority of the representative manufacturers and dealers in plumbers' supplies, and it was wisely decided that the campaign should properly commence here. Of the measure of success which attended the efforts of the Executive Committee it is not my purpose to speak. The end was accomplished within certain limits, and the results, so far, satisfactory. New York, therefore, having had her turn, is now out of the race, and the question arises, What is the best location for the coming term, discarding all sentiment and taking solely in consideration the best interests of the National Association? It may possibly be that our Western friends may consider that as the East has had her turn at executive administration it should move westward, and so deal with each section of the country impartially. If we take a merely sentimental view of this matter it would be the correct thing to do so, but when we look at it from a practical standpoint there is no doubt that the best interests of the trade demand that, for the next year at least, the headquarters should be in the East. The reason of this is obvious. The East is the great manufacturing centre, and while the manufacturers in New York and Brooklyn are in accord for the most part with the plumbers, there is a large field outside New York which has yet to be cultivated, and to be brought into equitable and harmonious relations with the trade. This cannot be effectively done with the Executive Committee located in any of the too far Western or Southern cities, because the officers could only communicate with manufacturers in the East by letter or with their agents, and even then with each one individually, while if located in the manufacturing centre conferences could be

arranged and joint meetings of a couple of hours' duration would effect more than a whole year's correspondence. As these, however, are my individual views, I give them for what they may be worth, and ask for them a place in your columns. I may add that the officers to be elected for the coming year should be located where they can actively engage the manufacturer and dealer in the largest centre.

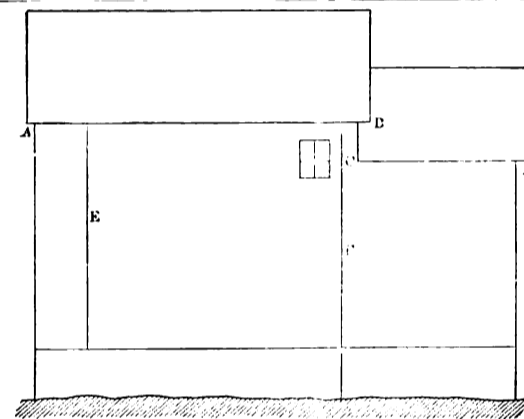
Yours truly, THOMAS J. BYRNE.

DRAIN AND WATER-CLOSET VENTILATION.

BANGOR, May 23, 1884.

To the Editor of THE SANITARY ENGINEER :

I SEND you a sketch of some drain-ventilation recently put up in this city by a firm of plumbers who are the leading ones in that business in this section of the country. The sketch represents the side elevation of the ell and woodshed of a house in this city. The line A B represents the gutter-line of the ell, and the line C D the gutter-line of the shed. At E is a conductor to carry off the water from the gutter A B. This conductor is carried into the cellar and into the hopper of a water-closet there, and this serves as a ventilator for the hopper as well as a water-conductor. This water-closet is situated on a branch to the main soil-pipe, which passes by it and out through the roof of the main house, full size. Between the hopper (which is ventilated by this conductor) and the main soil-pipe there is a trap. The soil-pipe enters a tile-drain near this water-closet, and after the drain passes out through the cellar-wall there is a tin conductor from this tile-drain, for ventilation only, running up the side of the house at F. This conductor was stopped close by the top of a window. Objections were raised by the owner of the house to the conductor F, owing to its proximity to the window. The plumbers contend that this is all right; that there can never be an up-draught through this conductor; that the soil-pipe in the house being higher and warmer than it, will cause a draught of air down through this conductor and up through the soil-pipe. Ordinarily such a ventilating-pipe they only



carry up about six feet from the ground and then leave it open. Now I would like to ask if this is considered the correct theory in regard to drain-ventilation, and is it the practice in general use in other cities, as claimed by the plumbers here? Would it work in the reverse order—i. e., down the soil-pipe and up the conductor, if the conductor should be carried higher than the top of the soil-pipe? Would it not be better to ventilate the hopper of a water-closet into a chimney, which is always heated, than to ventilate in the manner described above?

Yours truly, T. W. B.

[You do not state whether the drain is trapped outside of the pipe F. If it is not, that pipe delivers the foul air from cesspool or sewer in the immediate vicinity of the window. Put a trap in your drain, and take a pipe, F, from inside the trap to some place where it cannot be offensive, and extend but a foot or two above the surface of the ground. You will then, generally, have a draught in through pipe F, and up your soil-pipe. The liability of a reverse current is increased by extending pipe F to the top of the house. If the bowl of the hopper is ventilated into a heated flue take care that the flue has no other openings into any rooms, otherwise you run risk of turning the foul air into such room through those openings. Use a flue especially for the hopper vent, and for that only.]

MASSACHUSETTS WATER-SUPPLIES.—The Public Health Committee has reported a bill enabling cities and towns to protect the purity of their water-supply by taking the lands around any ponds or streams not exceeding five rods in width.

DR. TATHAM informs the physicians of Salford, Eng., that the Health Committee has provided an apparatus for the purification of infected bedding by means of high-pressure steam; that, on application, he will send to any address a suitable conveyance for the removal of the bedding, etc., and that the disinfected articles will, in all cases, be returned with as little delay as possible. We commend this for imitation by the health authorities of all our American cities.

BAD PLUMBING, LANDLORDS, AND TENANTS.

JUSTICE DALY, of the Court of Common Pleas of this city, has given a decision in a case involving the right of a tenant to move out of an apartment in a flat where the plumbing was dangerously defective, without being liable for rent thereafter, of so much interest that we print it entire. The jury had previously given a verdict for the tenant. Justice Daly confirms their verdict. We hope that the case will impress landlords with the conviction that it is to their interest to properly carry out the provisions of the plumbing regulations of this city.

CONSTRUCTIVE EVICTION.

COMMON PLEAS—GENERAL TERM.

MARY BRADLEY, Administratrix, against NESTOR DE GOICOURIA.

In a suit for rent claimed to be due from a tenant of a suite of rooms in an apartment-house, it appeared that defendant's wife and servants were taken sick by inhaling a malarial or poisonous gas in the apartments occupied by them; that this unhealthy condition of the apartment was owing to the defective condition of the general plumbing-work of the house, of which the landlord was notified by orders he received from the Board of Health requiring him to have changes made in the plumbing-work, and which unhealthy condition could have been removed if he had complied with those orders; that the defendant waited for two weeks, and, finding that nothing was done on the part of the landlord, left, under the apprehension that he was imperiling the health of himself and family by remaining.

Held, That this state of facts established a constructive eviction, and prevention of the free enjoyment of the apartments, so as to relieve the defendant from paying rent for them.

DALY, C. J.—This was an apartment-house known as the Oakland Flats, the general duty of keeping which in repair was upon the landlord and not upon the tenants of the separate apartments, each tenant being answerable only, under the covenant in his lease, for such repairs as were necessary in his separate apartments or suite of rooms occupied by him. It was the duty of the landlord to keep the general plumbing-work of the house in repair; and the defendant, as the occupant of a separate suite of apartments, was bound only to make such repairs in the plumbing therein as required no change in or was independent of the general plumbing-work of the house.

It was proved by the defendant's witnesses that the defendant's wife and servants were taken sick by inhaling a deleterious gas, which permeated the defendant's apartments, and which did so, not from any neglect by him to make such repairs as were incumbent upon him, but from the defective condition of the general plumbing-work of the house. The physician attributed the illness of defendant's wife, as well as of two of his servants, to what he described as "bad hygienic surroundings and bad drainage." He said that the situation of the apartments was good, and that there was sufficient cold, fresh air in the water-closet; but it was, he said, the bad hygienic surroundings, by which, he said he meant that the sewer-gas was not properly carried off, and came back into the house. He testified that when he examined the trap in the house, during his second visit, in May, he smelt a very bad odor, as if the sewage was not carried off. He came to this conclusion, he said, after he had investigated all the causes that might produce malarial fever and sore throat of the defendant's wife, and the malignant sore throat of one of the servants. Having come to this conclusion, the physician sent a note to the Board of Health, in consequence of which a physician, Dr. Nealis, was sent by the board to examine the house, who found, as he said, that there was no inlet air-pipe, and no main-house traps or sewer-fixtures, and no proper ventilation to prevent syphonage and suction from the traps; syphonage being described by the witness as "the exhaustion or suction of water from a trap, leaving it unsealed by the water, and permitting the sewer-gas to pass into the rooms the same as if the trap were lying open." The tendency, he said, from the want of what he called "back-airing in the general arrangement of the plumbing of the house" would be for the gas to generate in the sewer and pass in the pipes through the building; and, in case any defect existed, into the rooms; and he considered the manner of the construction of the pipes dangerous, as it might tend to produce syphonage.

An order was made by the Board of Health requiring the landlord to have certain changes made in the general plumbing-work of the house, among which he was directed to ventilate and complete the trap of the basins in the apartments occupied by the defendant, which were required to be ventilated above the house by a 2-inch pipe extending two feet above the roof. This order was made about the middle of May, but nothing was done by the landlord, and on the last of May, two weeks after the order was given, the defendant removed from the apartments.

On the 22d of June, more than a month after the order was given, the Board of Health sent an inspector to the flats to see if the order had been obeyed, who reported that none of the details or requirements had been complied with, and it was not until some time in July, after a second inspection, that a report was made that the order of the Board of Health had been complied with.

The plaintiff called as witnesses an architect, a plumber, a physician, and the janitor of the building, who controverted the testimony of the witnesses of the defendant in many substantial particulars; but we must assume, upon all questions of fact upon which there was any conflict, that the jury from their verdict believed the witnesses of the defendant. We must assume, therefore, upon the testimony of the defendant's witnesses, that the illness of the defendant's wife and servants was due to a malarial or poisonous gas in the apartments occupied by them; and that this unhealthy condition of the apartment was owing to the defective condition of the general plumbing-work of

the house, of which the landlord was fully notified by the orders he received from the Board of Health, and which could have been removed if he had complied with those orders, as he was bound to do. That the defendant waited for two weeks, and finding that nothing was done on the part of the landlord, that he left under the justifiable apprehension that he was imperiling the health and possibly the life of himself and his family by remaining.

This state of facts established a constructive eviction. If a tenant is deprived, by the wrongful act of the landlord, of the beneficial use of the premises and is compelled thereby to quit and abandon them, it amounts to what has been called a constructive eviction, and the tenant is thereafter relieved from the payment of rent (*Dyett v. Pendleton*, 4 Cow., 501; 8 id., 727; *Edgerton v. Paige*, 1 Hilt., 320; id., 20 N. Y., 221; *Cohen v. Dupont*, 1 Sand., 260; *Halligan v. Wade*, 21 Ill., 470; *Preston v. Jones*, 2 Tred. Eq., 350; 6 Bac. Abr. Rent, L. 44: *Taylor's Landlord and Tenant*, 378).

The unhealthy and perilous condition of the apartments occupied by the defendant and the landlord's neglect for two weeks to do what the Board of Health required him to do, was, in my opinion, as good a ground for the defendant's quitting the apartments, after he had waited for a fortnight for the landlord to comply with the order of the Board of Health, as the landlord bringing lewd women upon the premises, as in *Dyett v. Pendleton* (supra), or the landlord or his family constantly muffling the defendant's door-bell so as to prevent his knowing when visitors called upon him, as in *Cohen v. Dupont* (supra).

The first case was an act of immorality on the part of the landlord; the second, an unjustifiable annoyance of the defendant in his business as a dentist; and the wrongful act of the landlord in the present case was compelling the tenant to occupy the premises at the peril of his health, and possibly of his life, by neglecting to do what the landlord was ordered to do by the public authorities, and which it was incumbent upon him to set out about doing at once if he expected his tenant to remain in the premises. Having remained there a fortnight afterward and nothing being done, the defendant, in my opinion, was justified in quitting and abandoning the apartments, and, being abandoned under such a state of facts, it amounts in law to a constructive eviction, as fully, in my judgment, as did the facts in the cases above cited.

The question in the case was fairly put to the jury by the judge. He said that if the illness of the defendant's wife was caused by the unhealthy sanitary condition of the house, which was not a new escape of sewer-gas, but a result of a defect in the construction, which rendered the escape of gas in the closet a permanent thing, so that the apartments became unfit for occupation and dangerous to life, that the defendant had a right to remove from the apartments, and was thereafter discharged from the payment of rent; that the question, therefore, upon the evidence, was whether there had been such a constructive eviction and prevention of the free enjoyment of the apartments as to relieve the defendant from paying rent for them.

The jury found that there was, and I think that the judgment entered upon the verdict should be affirmed.

GENERAL SUPPLY OF WATER-POWER.

A CORPORATION styled the "General Hydraulic Power Company, Limited," is stated by *Engineering* to be doing a very considerable business in London. Its object is to supply water at a pressure of 700 lbs. per square inch for industrial purposes, such as pumps, presses, and lifts, over a large area of the city on each side of the Thames, between Blackfriars Bridge and the Tower. Several miles of mains have been laid, and many consumers connected with them. The water of the Thames is used, and this is so turbid that it has to be purified before distribution. The purification is effected by filters constructed by the Pulsometer Engineering Company, in which the filtering medium is sponges strongly compressed between two perforated plates, one of which forms the upper surface of a piston. The water enters each filter near the bottom, and rising through the layer of sponge, escapes at the top, the tanks for the muddy and clean water having a difference of level of about five feet to provide the necessary pressure. At the end of a time varying from twelve to twenty-four hours, according to the state of the river, the filter is cleaned, all its accumulated mud being entirely washed out, and the sponge returned to its original state of purity. To effect this the inlet-valve is closed, and a waste-valve near to it is opened, thus allowing a certain quantity of the clean water to flow back in the opposite direction to that in which it had already passed through the filter. But, as explained above, the effect of this, taken alone, would be *nil*, and it is necessary to break up and thoroughly work every particle of the sponge in order that it may be cleansed, just in the same way as a toilet sponge when filled with soap requires to be kneaded between the hands, alternately absorbing water and having it violently expelled by a vigorous squeeze, until at length all trace of soap is removed. In the filter this effect is obtained by alternately raising and lowering the piston, allowing the sponge to expand to about twice the bulk it occupies when at work, and then compressing it. The motive power for this operation is provided by the

high-pressure water of the installation acting in the small hydraulic cylinder shown at the top of each pair of filters. This is provided with a simple distributing-valve by which the motion is reversed at the end of each stroke, and the piston kept in motion for the ten or fifteen minutes during which the cleaning is continued. There are a number of handhole doors around the sponge-chamber, by which access can be gained to break up any lumps which may form in spite of the daily squeezing.

Every care is taken in these filters to prevent them getting out of order if the attendant should fail to give them the slight amount of attention they require. The cylinders are lined with gun-metal, and the pistons lagged with wooden strips, so that they will not stick even if they be left unmoved for days. The sponge lasts for a long time, causing little expense; and, as it consists entirely of clippings and small pieces, its first cost is not great.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

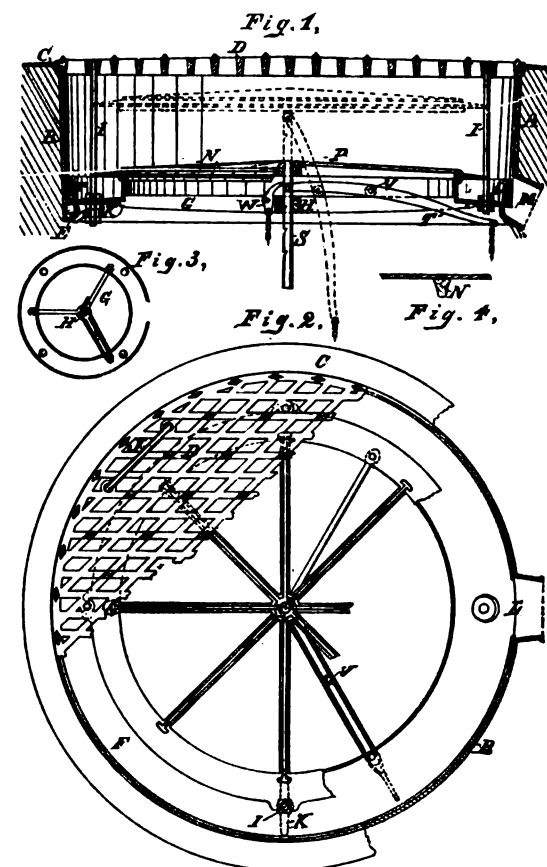
VAULT-COVER.

OUR illustration shows a novel form of illuminating vault-cover and ventilator combined.

The objects of the apparatus are the admission of light and the ingress or egress of air without the admission of water.

Figure 1 is a sectional elevation near a central line on the plan Fig. 2, and the latter figure is a plan of the different parts shown in elevation, some of which are partly broken away to show underlying members, the members or parts in all figures being indicated by like letters.

A represents an opening through a sidewalk or other nearly horizontal structure; B, a suitable casting fitted into



the opening; D, the top grating, level with the sidewalk; E, a channel-flange formed on the lower edge of B, to support the channel-plate F, and to collect any water that might pass the latter; G, three or more ribs radiating from the centre-hub H, and connecting with the channel-plate; I, rods which connect the channel-plate with the grating, and forming guides for the moving parts; J, handles for convenience in inserting and raising; K, buttons pivoted on the rods I, to secure the cover in place; L, an opening in the channel-plate covered by a wire strainer to allow the water-shed, by the glass, etc., to run off by the spout M.

The frame N P receives the glass plates and is made highest at the centre, so as to shed the water into the trough F. To the hub P in the centre of this frame is attached the rod S, which slides through the hub H. To this rod is pivoted the lever T, which is arranged on a sliding axis V. To the free end of the lever is attached a chain to be within easy reach of a person on the floor.

By pulling downward on the chain the transparent cover, N P, is elevated, as shown by the dotted lines, and an annular opening is formed around it for the passage of air.

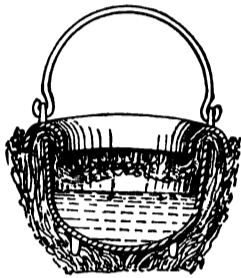
To withdraw the grating and cover, with their water-channel F, the buttons K must be turned, when all can be removed except the ring-casting B.

The apparatus is the invention of T. Wesley Langill, of 269 West Twenty-Second Street, New York.

PLUMBERS' MELTING-POT.

FROM the *Plumber and Decorator* we take the novel attachment to a plumbers' melting-pot, which we here show.

From our own knowledge of the good produced by placing a piece of sheet-iron over a pot, with a hole in its



centre, we think the concave ring covering the rim of the pot, and raised some distance above it, as shown, is a decided assistance in shortening the time of melting. It is patented by Messrs. Thomas and William Farmiloe, Westminster, London, S. W.

PATENT FUEL IN FRANCE.

A RECENT issue of consular reports contains an account of the manufacture of patent fuel in France.

The coal-dust which was formerly rejected as worthless is now burned in immense quantities in France in the form of coal-bricks. The natural supply of dust from the yards of the coal merchants being entirely insufficient for the needs of the brick-works, the manufacturers in and about Nantes import a large part of their dust from Cardiff, Swansea, and Newport, from what is known as the "Merthyr small steam-coal," from which the dust is sifted, leaving from 10 to 15 per cent. of fragments to be sold at a somewhat reduced price for use as ordinary fuel.

The process of manufacturing the patent fuel is very simple. The coal-dust is mixed with coal-tar pitch and poured into cups attached to a belt, each cup containing enough material for a brick of the size desired. The belt in its movement passes this material through a chamber where it is exposed to hot steam, which fuses the two substances into a homogenous mass. This is poured, by the descent of the belt, into molds, where it is subjected to an enormous pressure by a hydraulic press, or by machinery set in motion by a steam-engine.

The brick is square in form, its thickness being about one-third of its other dimensions, and, as manufactured in Nantes, weighs five, ten, or fifteen pounds. The railway companies refuse to accept fuel unless at least 10 per cent. of pitch has been used for its agglomeration. Fuel manufactured with a smaller per cent. of pitch is, of course, of inferior quality.

It is stated that for a number of years the Orleans Railway Company bought annually, by contract, from 45,000 to 60,000 tons of "briquettes" at the rate of twenty-seven francs (\$5) per ton.

The following estimate of the cost of manufacture is given by one extensively engaged in the business:

Coal, per ton, in Wales.....	\$1 00 to \$1 25
Freight on same.....	1 60 to 1 60
Duties on same.....	26 to 26
Handling, sifting, etc.....	56 to 56
Tenth of a ton of pitch.....	1 00 to 1 20
	<hr/>
	\$4 42 to \$4 87

The dust purchased directly from the local merchants costs \$2.80 a ton, delivered at the works. The pitch costs from \$10 to \$12 per ton.

It is claimed that "briquettes" are preferable to ordinary coal for exportation, on account of their compact stowage and freedom from small fragments and dust; also for use on locomotives, both on account of the economy of space which they permit, and because firemen can always determine the amount of fuel they are employing in a given time, the weight of each brick being exactly known. Bricks are also made of smaller sizes for domestic use.

NOTES FROM CHICAGO.

(From our Regular Correspondent.)

THE Chicago Master Plumbers' Association held its annual meeting Wednesday evening, June 4. President Andrew Young's report was heard by over one hundred members, the record certainly showing a live association and live officers.

The substance of the report is here given:

GENTLEMEN: According to your by-laws it is made the duty of the retiring president at the end of his term of office to make a report of the work accomplished during the past year. The year just past has been a most successful one for this association. Through your committee all differences between us and the dealer and manufacturer have been amicably adjusted, and this done in a spirit that has brought the manufacturers and dealers to look upon the members of this association as their allies and friends in furthering fair and honest trading.

Your committees of the past year have done the work assigned them honestly and well. The lectures and socials have been well attended, and have been the source of both pleasure and profit to the members.

Our relations with the Health Department have grown closer, and Commissioner De Wolf looks with favor on the efforts of this association in the cause of sanitary reform. In connection with Superintendent Genung, of the Health Department, he stated that since our organization the quality of the work done had improved so much that he had nothing but the highest praise for the association, for the good work it is doing and the influence it has exerted in that respect. Great credit is due your Library Committee for the work already performed, and if we are to judge the future by the past we will shortly have a library of which we may well be proud. The Committee on Exhibit of Plumbing Goods has fully perfected its plans and will commence at once to place the goods received in position. With our library and exhibits our rooms will be doubly attractive, and I predict a bright future for this association. In conclusion, I want to tender my thanks to the officers and committees of the past year for the able manner they have performed their duties, and to each and every member of the association for their zeal and earnest endeavors in behalf of our association. My thanks are due you for your leniency to my many shortcomings and errors; your kindness in that regard will remain a bright spot in my memory.

President Young was presented with an elegant watch and chain, the former suitably inscribed. The high services rendered by him to the association merited this costly recognition, and A. W. Murray did the presentation business creditably. Badges were presented to Martin Moylan, the retiring Corresponding Secretary; Treasurer, J. McGinley; Secretary, George Stokes; and Assistant Secretary, A. W. Murray.

The sense of the meeting was expressed vigorously against the movement of some gas-fixture manufacturers to establish local branch offices, and the matter was referred to a special committee, consisting of Messrs. Baggot, Clark, Bassett, and Roche. It was decided to take the *per capita* tax along with the delegates to Baltimore. Patrick Sanders was elected a member. A committee was appointed to secure reduced rates to the convention, the members being Patrick Sanders, Ryan, Wade, Boyd, Hevey. A communication was made to the effect that the journeymen wanted their employers to engage to employ union men only, and the matter was set for discussion and action at the next meeting. Frank E. Ruh resigned as delegate to Baltimore and William Sims was elected substitute. A picnic committee, to consider the desirability of such a diversion, was formed out of Messrs. Griffith, Brown, Hevey, Clark, and McGinley.

Following is the result of the election of officers for the ensuing year: President, Andrew Young (re-elected unanimously); Vice-Presidents, T. C. Boyd, D. Whiteford, Peter Williams, P. Harvey, and Martin Moylan; Financial Secretary, John J. Hamblin; Corresponding Secretary, Frank Ruh; Recording Secretary, William B. Oliphant; Treasurer, John Sanders; Sergeant-at-Arms, George Tipple. A pleasant wind-up of the evening was a call, in force, at his hotel, on Mr. Allison, President of the Cincinnati Plumbers' Association, and a delegate to the Republican National Convention. While Chicago plumbers are notably good citizens, on this occasion politics was not the principal article brought to the bar of discussion.

NOTES FROM PHILADELPHIA.

June 6, 1884.

THE Philadelphia Plumbers' Trade-School was closed on Friday evening, May 30, for the summer months. At the session on that night, Mr. Abram Mead, of New York City, was present and addressed the boys. The first season of the school has been remarkably successful, a large number of the boys of the trade in the city receiving instruction. There were in attendance when the school closed a total of forty-seven scholars. The school will be re-opened early in the fall and will be continued during the winter. The members of the Master Plumbers' Association, under whose auspices the school was organized and carried on, are highly gratified at its success.

An ordinance has been introduced into the City Council authorizing the Mayor to obtain the written opinion of three distinguished engineers on improvements in street-paving.

William B. Kinsey has been re-elected a member of the Board of Health of Philadelphia.

The Survey Committee of Councils have had under consideration an ordinance providing for the appointment of a commission to examine into and report on the present sewerage system of the city.

An ordinance has been introduced into councils providing for the appointment of inspectors of stone and iron inlets and inspectors of the construction of branch sewers, drains, and inlets.

DESTROYING DYNAMITE.

(From the *London Standard*.)

By direction of the Home Secretary, Colonel Majendie attended yesterday at the magazine, near Woolwich Arsenal, for the purpose of destroying the dynamite seized at Charing Cross, Paddington, and Ludgate Hill Railway Stations. The dynamite was in two deal boxes and a bucket, and each parcel consisted of forty-five cakes, or about twenty pounds. The first destroyed was that seized at Charing Cross, and the method adopted was burning, all the nitro-glycerine compounds being inflammable without explosion, unless they are detonated. Ten cakes were laid upon the ground, two deep, a slow match was applied, and the spectators withdrew. The dynamite, however, merely burst into flame, burning fiercely for about half a minute, and then dying out, leaving only a white ash, being the wood fibre used for absorbing the nitro-glycerine in the solid form. The remainder of the Charing Cross seizure was then destroyed in the same way, and then the two other quantities one at a time, no explosion occurring. The flame was of an intense orange color, tinged with purple and green, and it burned with a rushing noise. The boxes and packing were then set on fire. The bags in which the dynamite parcels were found and the clocks employed to fire the charges are preserved as evidence.

THE PLAGUE IN MESOPOTAMIA.

THE Oriental plague, or true bubonic pest, is endemic in Irak-Arabia and Kurdistan, and cases occur in this region almost every year. In 1880 the number of deaths from this cause in Mesopotamia was about 5,000. In April last the occurrence of the pest near Bédéa, a small village on a river of the same name which empties into the Tigris, was announced, and recent telegrams indicate its spread to other villages. Its origin in this locality is supposed to be due to importation from Persia, where the disease existed in 1883. Due precautions have been taken to prevent its spread, and there is no reason for apprehension.

THE *Local Government Chronicle* states that a grocer was recently brought before the Birkenhead County Magistrates' Court, England, charged with selling condensed-milk from which 90 per cent. of the fat had been abstracted before boiling down. Such was the report of the analyst, Dr. J. Carter Bell. A sample of the milk was afterward sent to the Somerset House Laboratory, and from the certificate received it appeared that in the opinion of the Somerset House analysts no portion of the fat had been abstracted from the milk. The case was therefore dismissed.

A SCARLET-FEVER EPIDEMIC.—There have been sixteen deaths from scarlet fever in Canandaigua, N. Y., recently. The Board of Health has issued an order prohibiting public funerals, and recommending the adoption of other sanitary regulations as long as the epidemic continues.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING MAY 31, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	12	17.8	3	25.0	1		2		1	2												
Boston	Mass.	427,900	177	21.5	60	33.8	9		26	3	6	6			3		6	5		5		2		5
Lowell	Mass.	70,000	22	16.3	7	31.8			3	1	1							3		1		1		
Worcester	Mass.	68,000	23	17.6	7	30.4	1		3			2					1			1		1		
Fall River	Mass.	65,000	15	12.0	3	20.0	2		1	1		1						1		1				
New Haven	Conn.	68,000	18	13.7	5	27.7			1		1						1	1		1				
Providence	R. I.	122,500	32	13.6	6	17.5	2		6				1	2			3		1					
Total		856,400	209	18.1	91	30.4	15		42	6	9	11	1	5		8	12	1	9			4		5
EASTERN CITIES.																								
Albany	New York	101,200	28	14.4	10	35.7			6		1	1				2	1	2						1
New York	New York	1,341,400	603	23.4	253	41.9	38	4	91	18	27	20	7	6	7	11	55		22		24	7		14
Brooklyn	New York																							
Hudson County	New Jersey	222,200	104	24.3	39	37.5	2	1	13	1	4	3		4	2	1	14		3		4	8		
Newark	New Jersey	152,800	59	20.1	25	42.3	2		5	2	4			2	1		6		3	1				
Philadelphia	Pa.	933,900	366	20.4	127	34.6	8	3	46	3	14	7	2	14		22	20	3	3		7		1	1
Wilmington	Delaware																							
Total		2,751,500	1,160	21.9	454	39.1	50	8	161	24	50	31	9	26	10	36	96	5	31	1	35	15	1	16
LAKE CITIES.																								
Buffalo	New York																							
Rochester	New York																							
Cleveland	Ohio	206,500	54	13.6	21	38.8	3		5		1			2		1	1	2			1			1
Detroit	Michigan	136,500	55	20.9	23	41.8			3	2	1	3					3		3		2			1
Chicago	Illinois	640,400	263	21.3	132	50.1	19	5	26	2	12	12	1	4	2	13	15	2	16		21	4		1
Milwaukee	Wisconsin	142,400	50	18.2	29	58.0	2	1	1		4	1		1		1	2	1	1					
Total		1,125,800	422	19.5	205	48.5	24	6	35	4	17	17	1	7	2	15	21	5	20		24	4		2
RIVER CITIES.																								
Pittsburg	Pa.	204,300	57	14.5	30	52.6	6		7		2	3		1		1	3		1		3			2
Cincinnati	Ohio	273,300	75	14.2	22	29.3	4	1	12		2					1	2		2			1		
Kansas City	Mo.	75,000	18	12.5	6	33.3			3		3					1								
Indianapolis	Ind.	91,700	13	7.3	2	15.3	1		4								1	2						
Minneapolis	Minn.	92,400	30	16.9	10	33.3	3	2	5	2	1	2					3		1		1			
Evansville	Ind.	33,200	15	23.5	8	53.3			5								2							
St. Louis	Mo.	367,300	91	12.9	29	31.8	7	1	13		2	5				1	3	4	4		3		1	1
Total		1,137,200	299	13.6	107	35.7	21	4	49	2	10	10	1	2	3	6	21	6	9		8	1	1	3
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	33	12.8	7	21.2	2		9			1			1	2		2			1	1		
Richmond	Col.	68,500	36	27.3	15	41.6	3		8		3				1	2	3	1	1					
Charleston	Wh.	30,500	15	19.7	3	20.0			2															
Charleston	Col.	30,000	29	50.3	8	27.6	2		4		3				3		1							1
Charleston	S. C.	25,000	9	18.7	7	77.7			1		5													
Atlanta	Col.	27,800	21	39.3	11	52.3			4		3						1							
Atlanta	Wh.	30,000	11	19.0	8	72.7			1		6													
Savannah	Col.	20,000	19	49.4	8	42.1			3		4							1	1					
Augusta	Wh.	20,000	5	13.0	3	60.0					1													
Augusta	Col.	15,000	10	34.7	3	30.0			2		4				1							1		
Nashville	Wh.	35,000	12	17.8	5	41.6	2				2													
Nashville	Col.	20,800	11	27.5	2	18.1	1		2	1					1									
New Orleans	Wh.	165,700	100	31.4	49	49.0	1		13		19	2		1	5		1				6		1	1
New Orleans	Col.	60,700	51	43.7	19	37.2	1		7		4			1			2		2		1		6	1
Total White		449,000	185	21.4	82	44.3	4		26	1	33	3		3	6	2	2	2	1		7	2	1	1
Total Colored		242,800	177	37.9	66	37.2	8		30	1	21	3		6	6	2	7	2	4		1		6	2
Total in 30 U. S. Cities		6,562,700	2,542	20.1	1,005	39.5	122	18	343	37	140	72	12	49	27	69	159	21	74	1	75	26	9	29
Total for the 4 weeks ending May 31, 1884		6,936,950	10,896	20.8	4,056	37.2	460	85	1536	165	404	314	58	200	120	294	822	73	390	11	263	133	44	123
Total in 28 English Cities																								
May 17	Total in 28 English Cities	8,762,354	3,540	21.1			125				35	23		35		70					151		43	182
" 17	" 8 Scottish Cities	1,254,607	592	24.5			13				11	7		7		12								
" 17	" 16 Irish Cities	858,660	394	23.9			4		53		13	1		9		15			100		13		43	
April 19	" 134 German Cities	8,639,670	4,306	25.9		1,883	99		725	48	205	165		40		72			85		2		5	
" 26	" 139 German Cities	8,907,685	4,438	25.9		1,972	104		687	52	211	159		42		63			530		58	26	2	51
May 3	" 137 German Cities	8,734,061	4,211	25.1		1,847	108		659	34	197	162		33		62			568		52	24	2	47
" 10	" 15 Swiss Cities	455,537	225	25.7			3		36		6	5		28		33			557		54	17		46

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.
Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.
The populations in this table are estimated to the middle of the eighth half-year from the date of the taking of the last census; that is, to March 1, 1884.

During the week ending May 31, 1884, in 30 cities of the United States, having an aggregate population of 6,562,700, there died 2,542 persons, which is equivalent to an annual death-rate of 20.1 per 1,000, a decrease of 1.4 from that of the previous week. In the North Atlantic cities the rate was 18.1; in the Eastern 21.9; in the Lake 19.5; in the River 13.6; and in the Southern cities, for the whites, 21.4, and for the colored 37.9 per 1,000. Of the deaths 30.5 per cent. were under 5 years of age, and the proportion of this class of deaths was highest in the Lake cities—viz., 48.5 per cent.

Accidents caused 4.7 per cent., consumption 13.4, croup 1.4, diarrhoeal diseases 5.5, diphtheria 2.7, typhoid fever 1.9, malarial fevers 1.0, scarlet fever 2.7, pneumonia 6.4, bronchitis 2.9, puerperal diseases 1.0, measles 2.9, small-pox 0.3 and whooping-cough 1.1 per cent. of all deaths. Diarrhoeal diseases caused 17.8 per cent. of all deaths in the Southern cities among the whites, and 11.8 per cent. among the colored. Diphtheria caused 4.0 per cent. in the Lake cities; and measles 3.7 per cent. among the whites in the Southern cities, and 3.0 per cent. in the Eastern cities. Deaths from small-pox were reported in Philadelphia, Cincinnati, and New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 12 new cases of diphtheria, 44 of scarlet fever, and 3 of typhoid fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 29 cases of scarlet fever and 6 of diphtheria under treatment May 31.

DETROIT, MICH.—Dr. O. W. Wight reports 21 new cases of diphtheria and 20 of scarlet fever.

BALTIMORE, MD.—The Health Officer in his weekly report records 142 deaths, including 59 under 5 years of age. The annual death-rate for the whole population was 18.05 per 1,000, or 15.34 for the whites and 33.80 for the colored. Croup caused 1 death, consumption 19, diarrhoeal diseases 9, typhoid fever 1, malarial fever 1, scarlet fever 2, acute lung diseases 20, measles 3, and whooping-cough 2.

MASSACHUSETTS.—During the week ending May 24, in 101 cities of the State, having an aggregate population of 1,336,911, there were 384 deaths. The annual death-rate was 16.15 per 1,000, against 16.35 for the previous week. The highest rate registered was 19.54 in Boston. The principal infectious diseases caused 43 deaths, among which were diphtheria and croup 17, typhoid fever 7, scarlet fever 6, diarrhoeal diseases 5, puerperal fever 4. To diseases of the respiratory organs were attributed 42 deaths, and to consumption 72.

RUSSIA.—*St. Petersburg.*—Week ending May 3: Deaths, 803; annual death-rate, 45.0 per 1,000. Small-pox caused two deaths, measles 53, scarlet fever 15, typhoid fever 22, diphtheria 19, whooping-cough 6, diarrhoeal diseases 92, and acute lung diseases 123.

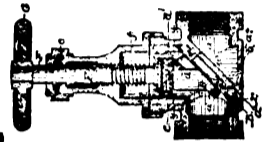
DENMARK.—*Copenhagen.*—Week ending May 13: Deaths, 113; annual death-rate, 22.0 per 1,000. Whooping-cough caused 5 deaths, diarrhoeal diseases 4, consumption 11, acute lung diseases 15, and violence 5.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

294,357. STOP-VALVE. JAMES H. BLESSING, Albany, N. Y. Filed May 16, 1883. (No model.) Issued March 4, 1884.



Claim.—1. In a screw-valve, the combination, with a valve-casing and an inclined valve, operated by a vertically-moving stem, of a removable valve-seat, arranged in an inclined position and supported by an annular tongue, which prevents a lateral movement of said seat, but permits a slight tilting movement thereof by reason of an elastic packing between said valve-seat and its support, thereby enabling the valve-seat to accommodate itself to the face of the valve, substantially as specified.

2. In a screw-valve, the combination, with a valve-casing provided with a valve-seat arranged in an inclined position, as herein described, and a removable sleeve provided with oppositely-arranged vertical valve-seats, of a valve adapted to be guided in said removable sleeve, and having its face on an inclined plane that conforms to the angle of the valve-seat, the line of motion of said valve being constantly in a vertical direction, but inclined in respect to the plane of the valve-seat, substantially as herein specified.

3. In a screw-valve, the combination, with a valve-casing, A, containing a transverse partition, a^2 , arranged in an inclined position, as herein described, a valve-seat, B, removably attached to the inclined partition a^2 , and a removable sleeve, C, provided with guiding-grooves c' , and adapted to secure the valve-seat B in place, as herein set forth, of the valve D, having its face set to conform to the angle of the valve-seat B, and having wings d' , that are adapted to engage in the guiding-grooves c' , as and for the purpose herein specified.

293,218. MACHINE FOR STRAIGHTENING WIRE. CARL ANGSTROM, Worcester, Mass. Filed September 19, 1883. (No model.) Issued February 12, 1884.

293,214. ASPHALTIC-CONCRETE CONDUIT. WILLIAM W. AVERRELL, Bath, N. Y. Filed May 25, 1883. (No model.) Issued February 12, 1884.

293,218. FIRE-ESCAPE. N. ROBERT BAAR, CALVIN J. COE, and IRA R. COE, Lowell, N. Y. Filed May 23, 1883. (No model.) Issued February 12, 1884.

293,222. STEAM-GENERATOR. GEORGE F. BROTT, Washington, D. C. Filed June 15, 1883. (No model.) Issued February 12, 1884.

293,238. FURNACE FIRE-GRATE AND FRAME. HORACE W. LOVELAND, Topeka, Kan. Filed May 21, 1883. (No model.) Issued February 12, 1884.

293,239. VAPOR-STOVE. FORDYCE ALLAN LYMAN, Cleveland, O. Filed September 1, 1883. (No model.) Issued February 12, 1884.

293,260. APPARATUS FOR HEATING AND VENTILATING BUILDINGS. JAMES H. MANN, Chicago, Ill., assignor to the Richardson & Boynton Company, of New York. Filed July 23, 1881. (No model.) Issued February 12, 1884.

293,278. FURNACE-GRATE. JOHN A. PRICE, Scranton, Pa. Filed May 17, 1883. (No model.) Issued February 12, 1884.

293,274. FURNACE-GRATE. JOHN A. PRICE and DUNCAN WRIGHT, Scranton, Pa.; said Wright assignor to said Price. Filed August 23, 1883. (No model.) Issued February 12, 1884.

293,278. TAP-HOLE BUSHING AND PLUG. HENRY A. RUTTER, Boston, Mass. Filed February 26, 1883. (No model.) Issued February 12, 1884.

293,296. STOVE-GRATE. EDGAR W. ANTHONY, Boston, Mass. Filed May 14, 1883. (No model.) Issued February 12, 1884.

293,317. FLUID-METER. HERBERT FROST, Manchester, County of Lancaster, England. Filed December 7, 1883. (No model.) Patented in England May 31, 1883, No. 2,720. Issued February 12, 1884.

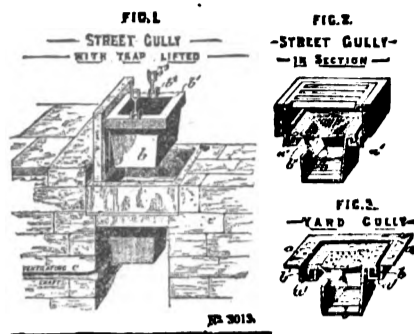
293,322. FIRE-ESCAPE. WILLIAM N. GRISWOLD, New York, N. Y. Filed October 29, 1883. (No model.) Issued February 12, 1884.

293,332. FIRE-ESCAPE. DENISON C. PIERCE, Chicago, Ill. Filed May 11, 1883. (No model.) Issued February 12, 1884.

293,367. DAMPER-REGULATOR. GEORGE W. SMITH, Milford, Mich. Filed July 14, 1883. (No model.) Issued February 12, 1884.

English Patents.

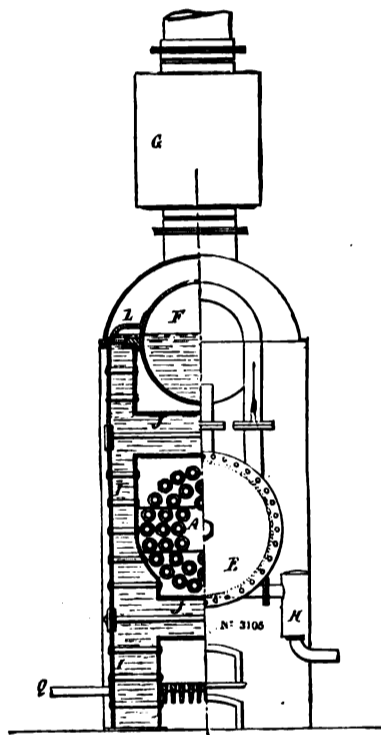
3,013. IMPROVEMENTS IN STENCH-TRAPS FOR DRAINS AND OTHER LIKE PURPOSES.



This invention has for its object the construction of stench-traps so that no escape of noxious gases or effluvia can possibly take place therefrom; at the same time the trap admits of the free passage downward of fluid matters into the drain.

WILLIAM AYRES, of Cable Street, St. George's in the East, in the county of Middlesex. Prov. Spec. June 18, 1883. Letters Patented December 18, 1883. (Price 6d.)

3,105. AN IMPROVED STEAM-GENERATOR OR WATER-HEATER. A communication from abroad by Jean Marie Henri Menay, of Havre, France.



This invention relates more particularly to water-tube boilers, and has for its principal object to establish a constant circulation of water and avoid the formation of scales.

HERBERT JOHN HADDAN, of Kensington, Middlesex. Prov. Spec. June 22, 1883. Letters Patented December 21, 1883. (Price 4d.)

Association News.

NEW YORK MASTER PLUMBERS.—The Association of Master Plumbers of the City of New York held its stated meeting on the evening of the 6th inst. with a large attendance, and after the disposition of the regular routine business the members, with their invited guests, gathered around the festive boards, ably presided over by President J. A. Macdonald, to partake of the banquet provided in honor of the opening of their new rooms, after which toasts and speech-making were indulged in by the members and their guests. Among the speakers may be mentioned Mr. J. L. Mott, who referred to his recollections of plumbers past and present; Mr. J. P. Quinn, who spoke of the pioneers of the trade; Col. George D. Scott referred to the first year of the existence of the National Association, and besought the members to have confidence in their chosen leaders, and accord them a hearty support. President Coyle, of the Journeymen Plumbers' Society, promised on their behalf an earnest co-operation in the furtherance of the interests of masters and journeymen. Mr. Thomas J. Byrne hoped that the present national organization would grow in usefulness, and that the result would be an international organization embracing England, Ireland, Scotland, and Canada. Mr. John Mitchell humorously referred to the supposed wealth of plumbers,

and denounced the injustice of public opinion toward the craft, and hoped for the dawn of a better era, when the unification of masters, dealers, and workmen would be an accomplished fact. Remarks were also made by Messrs. J. W. Birkett, Charles Harrison, Jr., John Hooper, of Colwell Lead Company, William McShane, F. A. Renton, M. J. Lyons, James Muir, and William Gibson, Jr., of THE SANITARY ENGINEER. The gathering was one of the most social in the annals of the New York Association, and did not adjourn until a late hour.

MASTER PLUMBERS OF BOSTON AND VICINITY.—The Master Plumbers' Association of Boston and Vicinity met at its rooms in Boston June 6, Mr. Isaac Riley, President, presiding. After the usual business was transacted the delegates to the National Association were balloted for, and the following elected: Isaac Riley, James F. Davlin, James Tucker, D. G. Finerty, John H. Stevens, William H. French, Henry Hussey. Alternates: J. F. Dacy, John Crawford, C. M. Bromwich. Seven new members were admitted.

PROVIDENCE, R. I., MASTER PLUMBERS.—The association met June 6, Thomas Phillips presiding. The usual order of business was observed. The electing of delegates was then brought up after considerable discussion on the subject. The following delegates were elected to the Baltimore Convention of Master Plumbers: Thos. Phillips, Patrick Tierney, George R. Phillips, E. Frank Casey, delegates; John Tierney, James Davis, Eugene McAuliffe, Thomas A. Marvin, substitutes.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—The society met June 4, Vice-President William H. Paine in the chair, John Bogart Secretary. Ballots were canvassed, and the following candidates were elected: As members: James P. Allen (transferred from junior), Charleston, S. C.; Henry P. Bell, Winnipeg, Manitoba; William F. Biddle, Philadelphia, Pa.; Wendell R. Curtis (transferred from junior), Savannah, Geo.; Chauncey Ives, Chambersburg, Pa.; Mace Moulton, Wilmington, Del.; Samuel Rea, Philadelphia, Pa.; Percival Roberts, Jr. (transferred from associate), Philadelphia, Pa.; Levi L. Wheeler, St. Louis, Mo. As associates: Alan H. G. Hardwicke, Buffalo, N. Y.; William Roberts, Waltham, Mass. As juniors: William H. Briethaupt, St. Louis, Mo.; Allan D. Conover, Madison, Wis.; Martin Gay, West New Brighton, N. Y.; Silas B. Russell, St. Louis, Mo.; Chandler D. Starr, New York City. A paper was read by A. M. Wellington, M. Am. Soc. C. E., giving the details and results of experiments with a new apparatus upon the friction of car-journals at low velocities.

NEW ENGLAND WATER-WORKS ASSOCIATION.—The third annual meeting of the above-named organization will be held at Lowell, Mass., on Thursday and Friday, June 19 and 20. Members of water boards are cordially invited to be present at any meeting of this association. Those expecting to attend are requested to promptly notify Horace G. Holden, Esq., Supt. Water Works, Lowell, Mass. The following topics have been appointed for papers and discussion: Service Pipes, material, size, etc., opened by a paper to be presented by W. H. Richards, Esq., of New London, Conn.; Filtration of Water, opened by a paper to be presented by H. W. Rogers, Esq., of Lawrence, Mass. On Friday, June 20, the different points of interest connected with the water-works of Lowell will be visited, after which the party will participate in an excursion on the Merrimac River to Tyng's Island, in time to connect with the late afternoon trains.

Notes.

CONSTRUCTION.

NASHVILLE, TENN.—Professor O. H. Landreth, of Vanderbilt University, will prepare the plans and specifications for locating the Holly-Gaskill Engine and Water-Works system.

MENOMINEE, MICH.—The contract for the Menominee Water-Works has been let to C. E. Gray, of St. Louis, Mo., who is at present also building the Duluth, Minn., Water-Works. K. P. Corby, C. E., of 71 Major Block, Chicago, Ill., is to be engineer in charge of construction at Menominee. It is expected that the Holly Manufacturing Company will supply the machinery. Work will commence within thirty days.—*Engineering News.*

ASBURY PARK, N. J., has many citizens who desire the borough to purchase the sewerage system.

MINNEAPOLIS, MINN.—The Board of Court-House Commissioners has accepted the plan proposed by C. P. Bassford for the new Court-House, and has recommended it to the County Commissioners. The cost will be about \$300,000.

SOMERVILLE, MASS.—The City Council has adopted the plans of George F. Loring for a new public library building, of brick, to cost \$15,000.

BOSTON, MASS.—The Board of Directors of Public Institutions, accompanied by the City Architect and the City Engineer, will shortly pay an official visit to New York to examine the public institutions in that city, to see in what respect, if any, they are ahead of similar buildings here.—*Boston Exchange.*

NEWARK, N. J.—The Board of Aldermen has requested the City Engineer to lay before it plans for improving the drainage of the Ninth, Tenth, Twelfth, and Fourteenth Wards.

ATLANTA, GEO.—The committee on boring an artesian-well has reported in favor of so doing.

NEW YORK.—Proposals for plumbing-work, etc., will be received by the School Trustees of the several wards for the following schools: Primary School No. 14, Fourth Ward; Grammar Schools Nos. 2 and 12, Primary School No. 36, Seventh Ward; Grammar School No. 38, Eighth Ward; Grammar Schools Nos. 3, 16, 41, Ninth Ward; Grammar Schools Nos. 7, 20, 75, Primary School No. 1, Tenth Ward; Grammar Schools Nos. 15, 22, 36, 71, Eleventh Ward; Grammar Schools Nos. 39, 46, 57, 68, Twelfth Ward; Grammar Schools Nos. 4, 34, Primary Schools Nos. 10, 20, Thirteenth Ward; Grammar School No. 30, Fourteenth Ward; Grammar Schools Nos. 10, 35, Fifteenth Ward; Grammar Schools Nos. 13, 19, 25, Seventeenth Ward; Grammar Schools Nos. 49, 50, Primary School No. 28, Eighteenth Ward; Grammar Schools Nos. 18, 27, 53, Nineteenth Ward; Grammar Schools Nos. 14, 49, Twenty-first Ward; Grammar Schools Nos. 9, 17, 28, 51, 58, 69, Primary School No. 41, Grammar Schools Nos. 61, 62, Primary Department, Grammar School No. 60, Twenty-third Ward; Grammar Schools Nos. 63, 64, Twenty-fourth Ward. Proposals will be received for the above at the hall of the Board of Education, Grand and Elm Streets, until June 16.

PHILADELPHIA, PA.—Bids were opened at the Highway Department for the construction of 2'4" x 3'6" oval-shaped sewer on Frankford Avenue, from Lehigh Avenue to Huntingdon Street, a total length of 892 feet, with five manholes, and the following proposals were received: From H. C. Eyre, of Chester, Pa., at \$2.39 per linear foot, \$29 per manhole and \$97 for each wellhole, required. M. C. Hong bid \$2.53 per foot for the sewers, \$29 per manhole, and \$100 per wellhole. S. Cox bid \$2.44 per foot, \$25 per manhole, and \$125 per wellhole. The first two bidders required three months to finish, while Cox required two months. Eyre being the lowest all-round bidder was awarded the contract. For the necessary grading and paving with asphaltum on Park Avenue, from Broad to Twenty-second Street, E. B. Warren and L. S. Filbert bid 17 cents per cubic yard of excavation, \$10 for rebuilding each inlet, and \$2.50 per square yard for asphaltum pavement. The contract was not awarded.

At the Water Department bids were opened for all the labor and material required for building a coal shelter at the Frankford Pumping Station, and the following proposals received: Thomas Gamon, \$5,795; Charles W. Rufer, \$5,405, and F. Thurwanger, at \$5,376.

During May 400 permits for the construction of buildings were taken out, covering 837 operations. During April there was 1,072 operations, covered by the 501 permits taken out.

DALLAS, TEXAS, WATER-WORKS.—The report of A. M. Wheelless, the Superintendent of the Dallas, Texas, Water-Works, for the year ending April 21, 1884, shows the expenses to have been \$3,267.91 more than the income. Of this sum, \$1,856.78 was expended for permanent improvements. The water-takers are very remiss in settling their accounts, and many of them complain of having to go to the City Hall to pay their bills, saying that the city ought to send a collector around. The City Engineer, W. M. Johnson, reports that 11,500 feet of pipe-sewers and 5,700 feet of brick-sewers have been laid, in pursuance of the plans for a general system of sewerage recommended by him. Sewage and street-water are separated, the former being carried in small pipes and the latter in brick-sewers. About 250 connections have been made with the

house-sewers. "Owing to the ignorance of the use and design of these pipes, some abuse has occurred and caused stoppages, which have been easily removed at a trifling expense." The cost of the pipes has been a dollar a linear foot, and of the brick drains or sewers about \$4 a foot.

ROCHESTER, N. Y.—The Executive Board has awarded the contract for the Chestnut Street improvement to Thomas Oliver & Sons for \$5,968.44. Chief Engineer Tubbs has been instructed to contract for a new boiler for use at the pump-house.

BIG RAPIDS, MICH.—The Common Council has appointed a committee of five to consider how the water-supply may be improved. The committee has made a contract for a drive-well as a test well. If they are satisfied with results, they will recommend the adoption of drive-wells as the chief source of supply.

GOVERNMENT WORK.

CUSTOM-HOUSE, ETC., CINCINNATI, O.—Synopsis of bids for ironwork of Post-Office screen, opened June 2, 1884: Joseph Hall & Co., \$7,975; Haugh, Ketcham & Co., \$11,300; Phoenix Iron Co., Trenton, \$14,125; Snead & Co. Iron Works, \$9,786.

CUSTOM-HOUSE, ETC., CINCINNATI, O.—Synopsis of bids for illuminating-tiling, opened June 2, 1884: Snead & Co. Iron Works, \$6,178; second sample, \$5,320; Concrete Illuminating Tile Co., \$4,611.50; Tice & Jacobs, \$4,879; Haugh, Ketcham & Co., \$4,975.72; Joseph Hall & Co., \$5,790.

POST-OFFICE AND COURT-HOUSE, SYRACUSE, N. Y.—Synopsis of bids for stonework and brickwork of basement and area walls, opened May 31, 1884: Dickson & Merrick, stone, \$8,970; brick, \$7,490; J. C. Esser & Co., \$12,800; W. R. & W. Haven, \$10,980; \$7,830; John Moore & Co., \$10,750, \$4,650; M. A. McGowan, \$11,690, \$8,800.

ON the 3d inst. the Board of Education for the city of Brooklyn, N. Y., opened bids for the plumbing of three new public schools, as follows:

PLUMBING ONLY.	BERKLEY PLACE SCHOOL-HOUSE.	DEGRAU ST. SCHOOL-HOUSE.	ROBERT ST. SCHOOL-HOUSE.
John A. Jennings.....	\$1,380	\$930	\$1,530
Gfroehrer & McCarty.....	.....	.....	1,678
James Hurley.....	1,542	918	1,474
James W. Birkett.....	2,175	1,300	1,500
James F. McNulty.....	1,593	940	1,619

Bids on plumbing-work were also opened for improvements in Public Schools Nos. 33, 10, 12, 21, and 22, as follows:

IMPROVEMENTS AND EXTENSIONS IN PLUMBING.	No. 33.	No. 10.	No. 12.	No. 21.	No. 22.
Gfroehrer & McCarty.....	\$375	.....	.....	\$925	\$185
John A. Jennings.....	350	\$625	\$300	715	175
James Hurley.....	373	467	283	722	135
James W. Birkett.....	475	580	470	800	65
James F. McNulty.....	393	574	349	649	164

The bids were referred to the School-House Committee.

IONIA, MICH.—The annual reports of the Board of Public Works of Ionia, Mich., and of Frank C. Sibley, Water Commissioner, show that to March 31, 1884, the cost of the water-works had been \$39,941.89. The water, collected from springs and wells, is pumped directly into the mains by two Smith & Vaile pumps. There are about eight miles of mains, mostly of Wyckoff Worden pipe, and 214 service connections. The water-rates collected for the year were \$1,617.25. The town has had a gravity supply since 1876, and the pumps were put in in 1883.

THE London water companies are increasing their charges and their profits. According to a return issued recently, the Chelsea Water-Works is making from 7 to 7½ per cent. already upon their capital, with practically no risk of loss; that the East London is making from 7 to 7½ per cent.; that the Grand Junction is making from 8 to 8½; that the Kent Water-Works is making from 10 to 10½, Lambeth 7½, Southwark 7½ to 8, and the West Middlesex 10 per cent. Every company, save one, shows an increase of profit; none of them prove any increase of work. Yet they want still to make their profits rise, with no compensating advantage to the public.—*Building News.*

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
June 7.....	24.60	18.40	22.60	28.70	28.19	18.37

E. G. LOVE, Ph.D., *Gas Examiner.*

PARIS has 57,405 street-lamps.

AN electric-light company, which will employ the Vandepoele lamp, has been organized at Ann Arbor, Mich.

THE Gülicher Company has completed its installation of the electric-light in the Crystal Palace. The two naves and the central transept are lighted by seventy-five arc-lights. The current is supplied by three dynamo machines.

A NATURAL-GAS well was struck on the Westinghouse premises, in the Nineteenth Ward of Pittsburgh, a few days ago, believed to be the largest in the country. Gas was struck at a depth of 1,660 feet, and the flow is said to be the heaviest ever encountered.

A SEWER explosion occurred recently in Baneswell Road, Newport, Monmouthshire, Eng., by which a part of the roadway was broken up and water forced into the adjacent shops. In several houses the flooring over the drains was torn up, and flames issued from the gaps. It is surmised that paraffin from a store near had run into the sewer.

PROF. BARRETT has commenced putting underground the fire-alarm and city telephone wires in the district of Chicago. A 9-inch iron pipe will be laid, and in this the wires will be placed. There are 500 miles of wire in use by the city, and sixty miles will be put underground this year, and the system extended as money is available.

AN American Electrical Exhibition will be held in Boston this coming winter, at which the interests and improvements in electricity pertaining to New England will be a special feature. It will conflict in no way with the International Exhibition to be held in Philadelphia, differing from it in one feature—that it will be self-supporting, asking no appropriation from Congress.

THE right of a gas company to require a deposit to secure its bills has been passed upon in the Supreme Court of Michigan. A large hotel in Detroit was refused a supply of gas because the proprietor declined to deposit \$100 as security. Suit was brought against the company for damages done to the business of the hotel through the want of gas, and the case reached the Supreme Court. Judge Sherwood decided that the condition of making a deposit for the security of its bills was one which the company had a right to make.

It is said that a man living near Stockton, Cal., put down a 7-inch pipe, and at a depth of 840 feet struck an abundant supply of good water. A 4-inch tube was then placed inside the larger one and sunk to a depth of 1,250 feet, when water was again found. This time, however, the water was saturated with combustible gas, which has been collected in a small holder and used as fuel.

THERE is a lively fight in Detroit over the proposition to light the city by electricity. The Board of Aldermen has voted to contract with the Brush Company to light the city by means of the lights from seventy-two towers, for the sum of \$95,000. When the matter came before the Board of Councilmen, there were delegations representing the Detroit Gas-Light Company and Excelsior Electric-Light Company. The latter offered to furnish as good a light for \$80,000, while the gas men argued that so large a sum should not be voted for a mere experiment. The Council Committee, after submitting a favorable report on the proposition, voted to lay the matter on the table.

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

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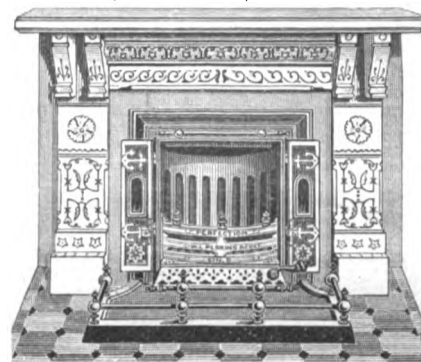
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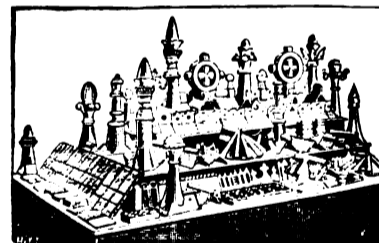
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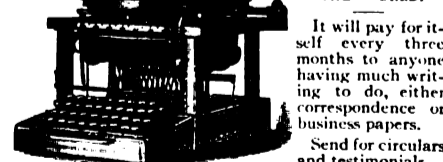
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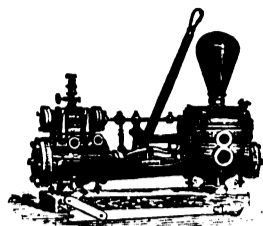
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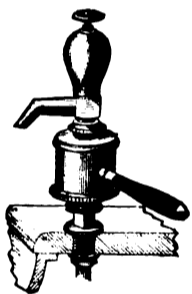
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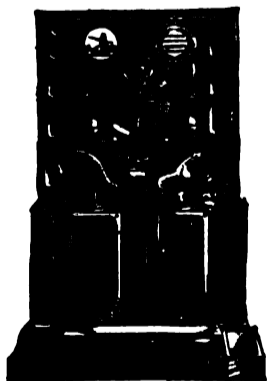
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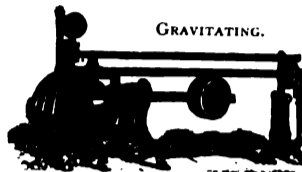
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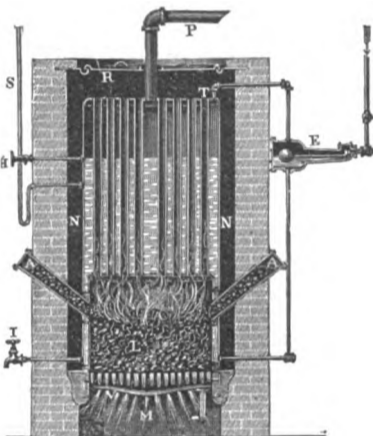
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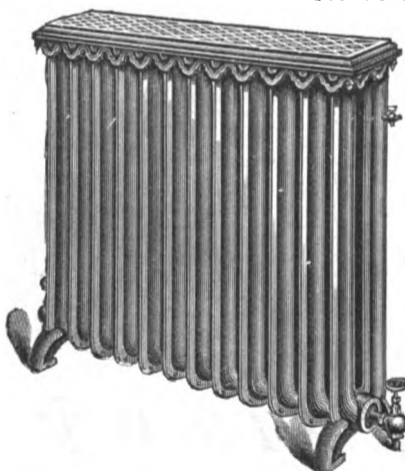
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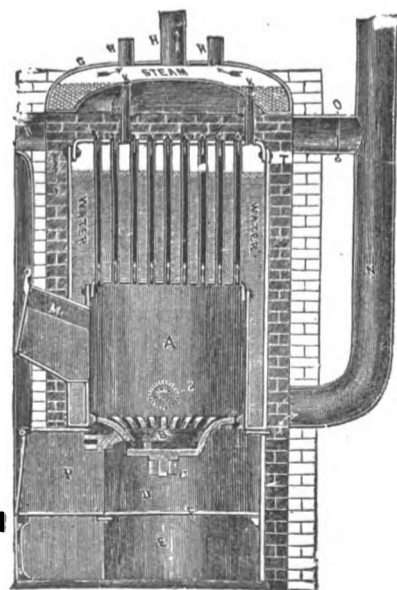
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PREVENTIVE INOCULATION FOR HYDROPHOBIA.

PROFESSOR PASTEUR has recently announced to the French Academy the results of some experiments upon the virus of hydrophobia, which are very interesting and suggestive, although by no means conclusive. He finds that if hydrophobia is communicated from the dog to the monkey, and then from one monkey to another, the virus becomes weakened at each transmission; it is, to use his phrase, attenuated. If this attenuated virus be inoculated on a dog, a rabbit, or a guinea-pig, it produces only a mild form of the disease, but the animal thus treated is more or less protected against the effects of subsequent inoculations of the virus. On the other hand, the virulence of the poison increases by successive transmissions from rabbit to rabbit, or from guinea-pig to guinea-pig, and in this way a virus may be produced which is decidedly more fatal than the virus of the ordinary mad dog.

By successive inoculations with virus gradually increasing in virulence, commencing with virus so attenuated as not to be dangerous to life, which will protect against a virus slightly more dangerous, M. Pasteur claims that he can finally inoculate a dog with the most deadly form of virus without endangering his life; that he can protect him from hydrophobia; and he proposes to have a test experiment made under the supervision of a committee of scientific men, in which twenty protected and twenty unprotected animals are to be inoculated with the same virus, his prediction being that the protected animals will escape harm while the others will die.

He does not say that he has discovered any micro-organism or "germ" of the disease, and still less that he has been able to propagate or attenuate the virus outside the living animal body, nor does he make any predictions that it will be possible to protect men in like manner. It must be remembered that Pasteur is not a physician, and it is by no means absolutely certain that the disease which he has inoculated is hydrophobia, since there are other fatal diseases which may be transmitted by saliva.

It is also very uncertain as to how long the protection thus produced will last, and still more uncertain as to what the effect of such inoculations would be on man, but at present it certainly seems extremely improbable that any general vaccination against hydrophobia is about to come into use. If it can be demonstrated that a virus can be thus not only transmitted, but multiplied and changed in its character, without the presence of any independent organism or germ, then we certainly have some very new and puzzling questions to solve; but as yet we have no definite or satisfactory information on this point, no details as to experiments—in fact, nothing which admits of scientific criticism, or on which one can base a reasonable opinion as to the practical benefits which may result from these discoveries.

When the commission which has been appointed to witness further experiments shall have made its report we may hope for full details, and we must wait for that report before becoming too enthusiastic over what may prove to be something very different from what M. Pasteur now supposes to be the case, but, in any event, he is worthy of all honor for the very difficult, and in some respects dangerous, research which he has so successfully conducted.

WISDOM IN THE CONVENTION.

THE Master Plumbers' National Association will suffer injury at the very beginning of its career, unless the convention which meets at Baltimore the 25th shows much moderation and sound judgment. If the result of the meeting of the two conventions which are called there on that date is to be to perpetuate the unfortunate strife over the executive committee which has gone on through this year, chiefly in New York, the public repute of the whole trade will suffer, and the prospect of forming a national association of any value will be almost destroyed. The delegates should, therefore, go to Baltimore determined to settle this executive committee matter in a spirit of conciliation and fairness, consulting what in their judgment will make for the good of the whole trade, and not only that of either party in the dispute. One thing they should go decided on, and that is that the quarrel shall be put an end to, and the status of the committee so defined for another year that it cannot break out again. It may be possible to compromise the matter and bring all parties together harmoniously, and the New York association should co-operate with the out of town members, who have been much disappointed at the course affairs have taken, in bringing about such a result if it is possible. But at any rate the convention should resolutely decide to prevent the troubles lasting another year, and the New York members owe it to themselves and to the association to assist the convention in doing so.

This matter is of great importance, because the convention ought to do much to place the plumbing trade in a better light before the public and toward sanitary progress. The convention should remember that the discussion of sanitary topics the past few years has had a very important bearing on the relation of the trade of the plumber to the public. One fact which is always brought out in such discussions is the importance of that trade to the public health, while the agitation of the principles which govern good plumbing has given it much of a scientific character. Consequently the trade is rising from the position of a mere handicraft to almost that of the skilled professions.

The past year, also, has witnessed the bringing forward by several local associations of questions of great importance. The apprenticeship question, especially in Chicago and New York, and the kindred one of plumbers' practical education in Philadelphia, have been carefully discussed, and action toward introducing a better order of things, through a modified apprenticeship system, or through the maintenance of practical schools, has been taken.

The question of trade ethics, or the relation of plumbing associations toward skin plumbing, has been earnestly considered in St. Louis and Cincinnati, and indeed in about every one of the local associations of much vitality.

The co-operation of the plumber with the Health Officer and public authorities has been publicly exemplified, notably in Philadelphia, Boston, and Chicago, and, we believe, has given the master plumbers of those cities a standing in the eyes of the authorities they never before possessed.

If the National Association will make itself a power to influence the progress of these subjects through the branch associations, it will unques-

tionably do very much to raise the trade to a level with public demands, and will be in reality a valuable aid to plumbing progress in the United States. And right along with this the convention should not allow the plumber to be put in a position of hostility to engineers, whether civil or sanitary. There is no doubt that if some of the oldest and best members of the last convention had freely expressed themselves they would have advised a different attitude on this question than was taken in the announcement of the objects for which that convention was assembled. It was the opinion of such members that the qualified plumber is himself a sanitary engineer, and both are working for the same object—viz., to construct the drainage of houses according to the best known principles. They deprecated the idea of any opposition, and took the ground that the true position of the convention was that the competent plumber desires the co-operation of the competent sanitary engineer as he desires information from any other available quarter.

This is the sound sense of the situation, and is also the decided view of the general public, and it should be taken by the convention.

The topics we have named cover the main points of the broad relation of the plumbing business to the general public, and we close by reminding the convention that, so far from being new suggestions, the National Association is already pledged to them. If the members will consult the address of Major Foster, president of the first convention, they will see in his outline of the purposes of association exactly the spirit of our statements, and the report of the Committee on the Organization of a National Association put them very emphatically. Their report was in part as follows:

"3. To advance the science and art of our trade by encouraging inventions, making known discoveries, and improvements, and appliances, fostering interchange of thought, and eliciting and communicating for the benefit of each member, the vast talent, the result and the experience, and the ability of all.

"4. To promote amicable relations with employees on the basis of mutual interest, and mutual justice to both employers and employees.

"5. To encourage State legislation for the furtherance of the interests of sanitary laws.

"6. To secure for members of the trade equitable treatment in their dealings with manufacturers and dealers in supplies.

"7. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils growing from deficient training in responsible duties. For selecting, arranging, and fitting up the material relating to hydraulic and sanitary condition of dwellings.

"The Committee on Organization beg you to create and maintain a sanitary code, at as high a standard as the progress of chemistry, philosophical and mechanical knowledge admits."

The first convention adopted that report as the expression of its principles.

TENEMENT-HOUSE COMMISSION.

GOVERNOR CLEVELAND has signed the bill passed by the last Legislature of this State creating a commission to "investigate and inquire into the character and condition of tenement-houses, lodging-houses, and cellars in the city of New York."

The bill names eleven commissioners, and they are: Alexander Shaler, Joseph W. Drexel, S. O. Vanderpoel, Felix Adler, Oswald Ottendorfer, Moreau Morris, Anthony Reichardt, Joseph J. O'Donohue, Abbot Hodgeman, Charles F. Wingate, and William P. Esterbrook.

These gentlemen have before them a work of utility rather than sentiment. The social problem of how to house the poor in our cities is receiving attention from statesmen and amateurs in social science. And the greater consideration it receives, the less is sentiment found to be the lever by which the recognized evils can be removed. There are practical questions to be determined which must be approached in a practical way and by minds capable of appreciating

the full force and effect of the existing evil system, as well as grappling with the difficulties which attach to it.

No plan which will keep the poor in poverty by compelling landlords to supply them with house accommodation at less cost than such as will make a reasonable return for money invested will accomplish any permanent good, but rather tend to degrade the tenants and retard improvement. As a rule, landlords supply such apartments as are demanded by the tenants, and the tenants must, therefore, receive a large consideration in the coming investigation, so that some means may be adopted for their education in sanitation—possibly through the medium of rigid house-inspection and the infliction of penalties for violation of rules of health when their acts or neglects are the means of injury to others than themselves.

Before the next Legislature meets, to which the results of its investigation should be submitted, the commission will have ample opportunity of studying the home life of the poor, or the absence of it during both the warm and cold seasons.

The commission is a large one and we fear will prove somewhat unwieldy. Its composition is such, however, as to assure a capable and intelligent investigation if that active and earnest interest is manifested in it which the subject demands.

A NUMBER of milk-dealers recently appeared before Dairy Commissioner Brown, and represented that the adulteration of milk by the addition of water was almost universal, and that the practice was rendered necessary in consequence of the consumers' demand for low prices. It is hardly to be presumed that the Commissioner was gulled by such talk as this, although he promised to give the matter his attention. If the dealers in question wish to confess their frauds to the Commissioner, the public will hear of it with pleasure, and advise them to go and sin no more. At the same time we believe there are honest milk-dealers in the State, and we doubt very much whether they will relish this wholesale accusation. These conscientious dealers promised to render all the assistance in their power, and to give the names and routes of all milkmen selling under the price. This promise rather shows what their particular grievance is, and that they hoped to convince the Commissioner that all low-priced milk was necessarily adulterated.

It is to be regretted that the bill requiring alterations of plumbing-work in this city to be done according to plans approved by the Board of Health, should have failed to receive the Governor's signature. It is in old work especially that the gross blunders are discovered, and under the existing law the board can only require such modifications as will obviate the nuisance. Had this amendment, however, gone into effect, every alteration of plumbing-work would have been required to be done in accordance with the board's rules governing plumbing in general. Our readers are well aware of the great need that existed for just this extension of the board's authority. What reasons Governor Cleveland had for neglecting to sign the measure have not been announced. We do not understand that objection to it was made from any reputable quarter, and had he understood its importance to this city we believe it would have been signed. As it is, a much needed sanitary measure has been delayed, though the occasion for it has been made plain ever since the present regulations for new work has been in force.

In another column will be found illustrated what the New York Board of Health calls a by-pass, which, when it exists, makes abortive the safe-guards of traps. On previous occasions we have given diagrams to show how this may occur in work on which no expense has been spared to make it perfect, if the plumber in charge does not exercise a degree of judgment

and a scope of observation, which is justly expected of him. In the present case it was an alteration or deviation from the plans as passed by the Health Department. It was difficult for the plumber to get an S-trap beneath the bathtub and be able to reach it, and, without foreseeing any harm, he took it on himself to place the running traps where shown, considering them more convenient of access, but never thinking that such an apparently trivial change should call for a further examination or exercise of judgment. This clearly points to the fact that in the education of plumbers the possibility of a by-pass must be clearly pointed out, and that in the planning and construction of work the master plumber must always be on the alert for such a contingency. Nor must this be taken as a defect in a system in a principle. It is neither, as it can only be occasioned by a *direct departure from good practice*. If in this case the water from the basin-trap had not been made to pass through the trap of another fixture in its flow to the soil-pipe, the result could not have occurred.

THE recent appointment by Mayor Edson of Mr. E. Henry Lacombe to be counsel to the corporation of New York, is an evidence of adherence to the principles of civil-service reform, as pleasing as it is unexpected. Mr. Lacombe has been for several years connected with this office, and has discharged the important duties intrusted to him with notable intelligence and industry. The acquaintance he has thus acquired with the intricacies of municipal law fits him for the place to which he has been appointed.

OUR BRITISH CORRESPONDENCE.

The Health Exhibition—Medical Congress at Copenhagen—Exhibition of Inventions and Music for 1885—Insuring Water-Fittings.

LONDON, May 31, 1884.

VISITORS to the Health Exhibition continually increase in numbers, and averaged last week a daily attendance of fourteen thousand. On Saturday there were upward of twenty-five thousand people present. The evening fêtes are very popular, and really the illumination of the grounds and buildings is remarkably fine, and for this purpose alone the exhibition is well worthy a visit. But as time progresses the exhibits themselves, now that they are pretty nearly all in their places, attract increased attention, and although the majority of them have but little connection, either directly or indirectly, with sanitary matters, they are very interesting and instructive. Furniture exhibits are exceedingly numerous, appearing in nearly every court, but particularly in the south central gallery, where the stall of THE SANITARY ENGINEER is situated. "Old London" was illuminated last Saturday evening for the first time. The incandescent lamps are skillfully arranged, so that although not conspicuous, they light up the whole of the buildings well.

It may be worth while to notify those who purpose attending the Medical Congress at Copenhagen, to be held at the beginning of August, that the pleasure-yacht "Ceylon" is intended to be despatched thither from England for the special convenience of those who intend being present at the congress. She is a large vessel, and fitted up for pleasure cruises, and as the hotels at Copenhagen are neither numerous nor large, the idea of sending the vessel is a good one, particularly as the fare (£30 for the time) is not large, when it is remembered that it includes not only passage-money, but living on board in port, table wine, and boat service.

The financial success which attended the Fisheries Exhibition, and which will doubtless also result from the present year's so-called International Health Exhibition, has induced the authorities to make arrangements for holding next year another international exhibition, to be divided into two divisions, the first comprising apparatus, appliances, processes, and products invented since 1862, and the second to be devoted to music since 1800. Seeing that the exhibition is intended to be international, it is to be hoped that American exhibitors will be given an opportunity to take an active part in it, and that arrangements may be made accordingly, as there is no time to spare. The Prince of Wales, as President, has nominated the following executive

council : Sir Frederick Bramwell, Chairman ; the Marquis of Hamilton, Vice-Chairman ; Sir Frederick Abel, Mr. T. Lowthian Bell, Mr. Edward Birkbeck, M. P., Honorary Treasurer ; Colonel Sir Francis Bolton, Sir Philip Cunliffe-Owen, Professor Dewar, Mr. Joseph Dickenson, Sir B. T. Brandeth Gibbs, Sir George Grove, Mr. Edward W. Hamilton, Mr. Harry Jones, Mr. W. H. Preece, Sir Edward James Reed, Professor W. Chandler Roberts, Mr. John Robinson, Mr. John Stainer, and Mr. Webster, Q. C. The Secretary of the present exhibition, Mr. Edward Cunliffe-Owen, will fulfill the same duties to the exhibition of 1885.

A novel, and perhaps unique, style of insurance is carried out in connection with the water-supply of Birmingham. The corporation undertakes to keep in repair all water-fittings of premises, where the supply is not by meter, for an annual premium equal to about five per cent. on the water-rental. There is an additional charge of 2s. 6d. for each bath, and five shillings for each closet. The agreement includes the unstopping of closets and waste-pipes (but not drains), and renewal of all parts of apparatus rendered defective by ordinary wear, tear, or frost. Iron or hot-water pipes are alone excluded. SAFETY-VALVE.

OCCASIONAL NOTES.

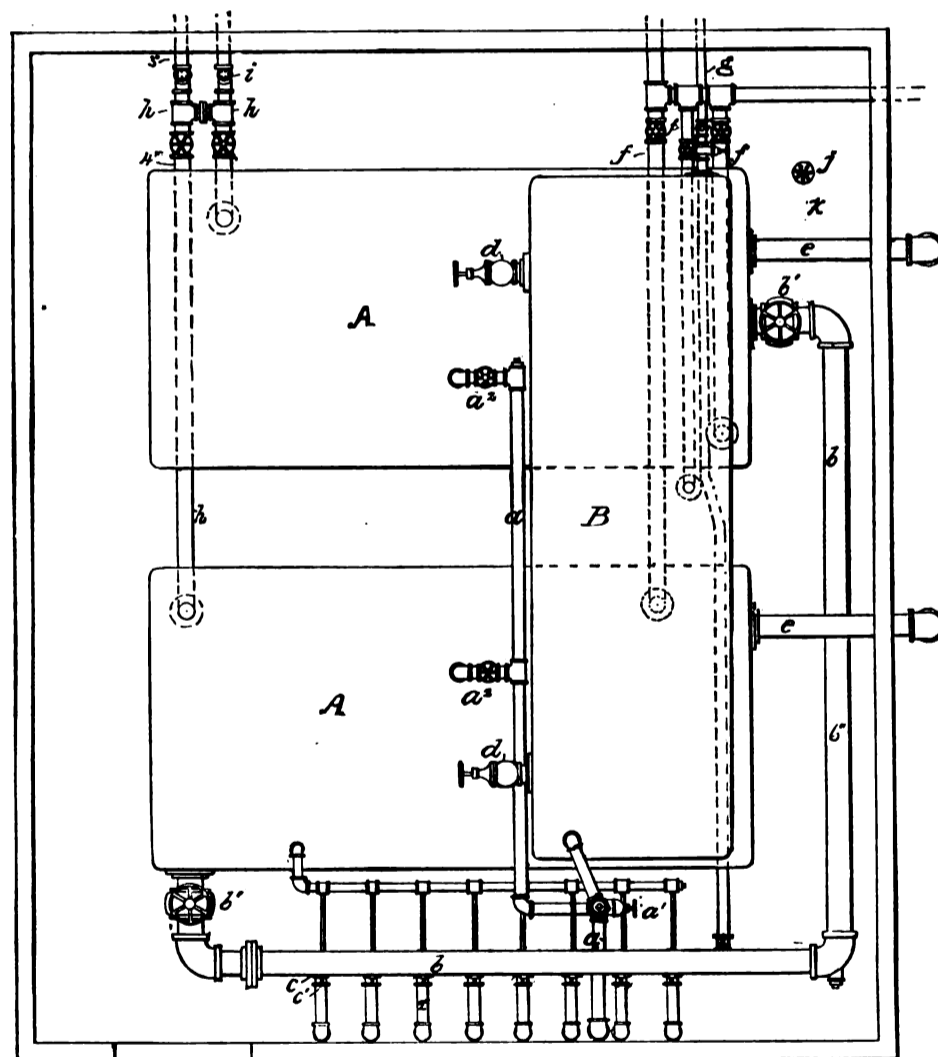
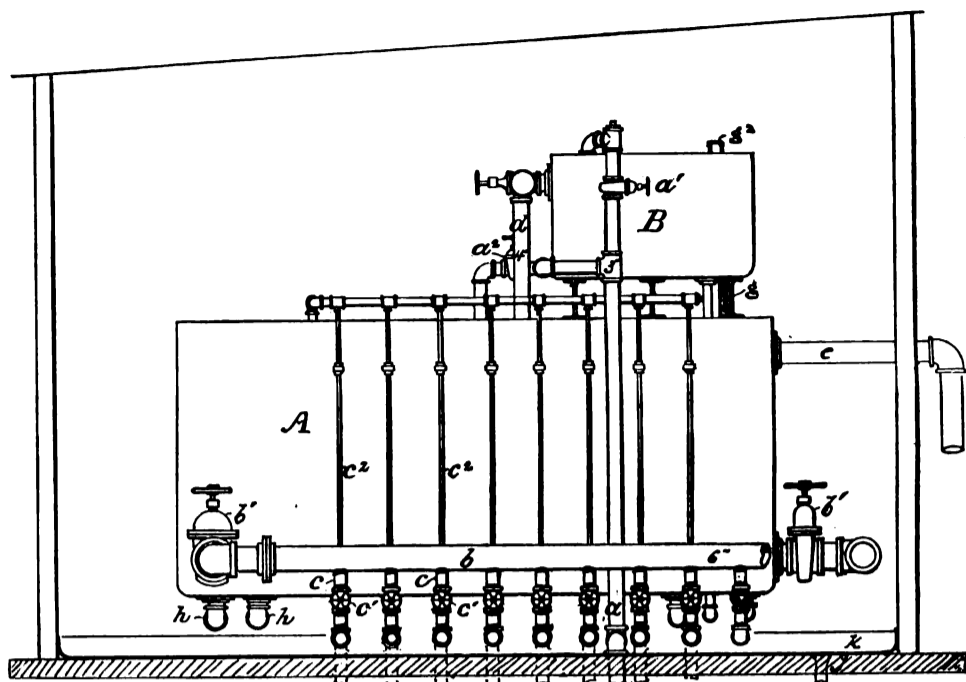
LONDON, June 7, 1884.

ON Wednesday, Thursday, and Friday of the present week conferences have been held at the Health Exhibition under the auspices of the Mansion House Council, on the "Dwellings of the Poor." On Wednesday the papers read were "The Population of London and Its Migrations," by Mr. Longstaffe ; "The Treatment of the London Poor," by Miss Toynbee, and "Overcrowding," by Rev. A. Mearns. In the first of these papers emigration was strongly insisted on as the only remedy to meet the problem of an overstocked labor market. Emigration not from country places to towns, but from England to newer countries, such as Canada and the United States. In the paper on the "Treatment of the London Poor," a vigorous appeal was made for more opportunities of recreation for the overworked poor, so that they might be better fitted for the work they had to do, and that recreation might serve by way of compensation for the wretchedness of their homes. In the opinion of the author of the paper on "Overcrowding," the remedies were two-fold : (1) The registration and inspection of all property let out in single rooms, and (2) the erection of artisans' dwellings where single rooms would be acquired at a rent not exceeding two shillings a room per week. At the conference on Thursday papers were read on "Suburban Dwellings and Cheap Railway Fares," by Mr. T. Hole, and the "Creation of a Building Fund," by Mr. Harrod. The Archbishop of Canterbury, who presided, made a few remarks on the dwellings of the poor, and stated in his opinion the working-classes did not altogether favor the model system of dwellings, and added that it would be desirable to have around London tracts of common land, like in Vienna, for the recreation of the people, and most of the public houses could very well be dispensed with.

At a recent meeting of the Council of the Association of Municipal and Sanitary Engineers and Surveyors it was unanimously resolved to admit engineers holding chief municipal appointments in the United States, the Colonies, or any European country. The object of this association is the promotion and interchange among its members of that species of knowledge or practice which falls within the department of an engineer or surveyor engaged in the discharge of the duties imposed upon him by the sanitary and other acts. It is hoped that this increment of members will be of great advantage to the association.

The committee appointed about two years ago by the Sanitary Institute of Great Britain to inquire into cowl and other ventilators, is about to resume its investigations and experiments. A sum of money will be voted out of the funds of the Sanitary Institute for this purpose, notice having been given by Captain Douglas Galton, C. B., to that effect.

The Council of the Sanitary Institute of Great Britain is desirous that if possible one or more papers should be read by American scientists at the forthcoming meeting of the Congress to be held in Dublin the first week in October of this year. If any readers of THE SANITARY ENGINEER feel disposed to benefit mankind by furnishing a paper on sanitary matters for this purpose, they are requested to communicate with Mr. E. White Wallis, the Secretary of the Institute, at 74 Margaret Street, London.



HOUSE-TANKS IN THE MUTUAL LIFE INSURANCE COMPANY'S BUILDING.

THE MUTUAL LIFE INSURANCE COMPANY'S NEW BUILDING IN NEW YORK CITY.

No. IV.

(Continued from page 30.)

OUR illustrations show the arrangement of the "house-tanks" of this building.

The house-tanks proper of this class of buildings are reservoirs for the holding of water for domestic and fire purposes, and must not be confounded with the hydraulic-elevator tanks.

The tanks A, A are made of $\frac{3}{16}$ -inch iron plates, and are each 12 feet long by 6 feet wide by 4' 6" deep, and consequently they, together, hold somewhat over 5,000 gallons, and supply water to all the principal floors. The tank B is 16 feet long by 4 feet wide and 2 feet deep, with a capacity below the overflow-pipe of 800 gallons, and supplies water to the restaurant, etc., above the eighth floor.

The usual way of using the tanks is to force the water from the receiving-tanks in the cellar through the pipe *a* and valve *a'* to the tank B,

the valves a^2 being closed. This allows all the water to go to the tank B, from which it overflows into the tanks A, A, through the pipes and valves d , so as to waste none of this water, as the upper tank is intended for culinary purposes only, and is consequently always filled with Croton water. But it is intended to use the artesian-well water to as great an extent as possible for water-closet purposes and for flushing, and for that reason the pipe a , with its valves a^2 , are carried to the tanks A, A separately.

From one or both of these tanks the water is delivered into the 6-inch pipe b through the valves b^1 , and thence distributed to the different lines of plumbing fixtures through the 2-inch pipes c , each of which has a gate stop-valve, c^1 , in the tank-room. The pipes c^2 are $\frac{1}{2}$ -inch pipes, which connect with the 2-inch pipes c below the valve, and which are carried above the edge of the tank, where they are connected into a header-pipe. The object of these pipes is to allow air to enter any particular line should a valve, c^1 , be shut off, to facilitate the withdrawing of water from the line, for the purpose of emptying it. The pipes e are the overflow-pipes from these tanks, and discharge on the brick roof. The pipe g is a 2-inch supply-pipe from the upper tank to the restaurant, but this pipe is also arranged to be supplied from the lower tanks through the 6-inch pipe and the 2-inch branch shown by the offsetted dotted lines under the tanks. The pipes f, f, f are for the purpose of drawing the water from the tanks, to allow of cleaning the bottoms, and for other obvious reasons, and are branched in the two directions, as shown, to the heads of soil-pipes, that the water may be used for flushing. The pipes h, h are where the fire lines connect with the tanks, and are four inches in diameter inside the tees, and are reduced to three inches at the check-valves i . The two lines, as shown, ascend the building in the principal hallways, and come together at the tanks. The vertical fire lines, where they ascend, extend to above the roof, and consequently above the tanks, but when the pressure is applied from the fire-pumps, the closing of the check-valves prevents the entry of the water into the tanks, and gives sufficient pressure at the roof to throw water to surrounding buildings to a distance equal to the corner of Maiden Lane and Nassau Street, a radius of about 300 feet. The object of this arrangement is to protect the façade of the building against surrounding fire.

All the water-pipes shown and all those within the building used for water, with their fittings and valves, are brass, irrespective of size, the pipes and fittings all being tinned.

The floor of the tank-room is lined throughout with 4-pound lead, to form a safe, K, which is provided with a large safe-waste at j .

The objects to be attained with the above arrangement of tanks and pipes are that either one of the tanks A may always be kept full of water for fire purposes; that the other will be used for general water-supply, and that either one will do the purposes of both, should one be out of order or be undergoing the process of cleansing.

To the practical man the diagram may suggest other combinations, such as passing the water from the tank B through the pipe g into the pipe b , thence distributing it through the pipes c, c , should the two valves b^1 be closed, or no water in the lower tanks.

The tank-room, or house, more properly speaking, is built so as to come partly through the roof, and is of iron, lined with fire-proof blocks.

SINCE the installation of the metropolitan drainage for London in 1859, says the *British Medical Journal*, the level of the water in the soil has been lowered thirty feet. It is seldom, at the present time, an engineering difficulty to get rid of the water in making excavations; and the basements of houses, and even the foundations, in the lowest parts of London are now generally surrounded by a comparatively dry soil—a condition of things the very reverse of what was previously the case, and wholly in favor of the public health.

A LARGE TENT HOSPITAL.

MESSRS. A. & C. HARSTON, architects, have prepared a memorandum on the large tent hospital at Gore Farm, Darenth, Kent, which was established last March under the direction of the managers of the Metropolitan Asylums District for the reception of convalescent small-pox patients from London, and from this memorandum we take the following description:

"The camp consists of nine 50x25-foot hospital marquees which are used as sleeping-tents for females and children, six similar marquees for men, three for nurses, and two for *commissionaires* and other male employees. There are also two larger marquees for the day use of the male and female patients respectively, tents for the medical superintendent, steward, and superintending nurse, and numerous smaller tents used as sculleries and commode tents, etc.

"The sleeping-tents form a double row, with a space of 80 feet between, and in each row they are placed 50 feet apart, and slightly *en echelon*, to suit the levels of the ground. The tents for females and children occupy the upper part of the ground, and are divided by the bath-house, and the inclosure containing the nurses' tents from the part of the camp occupied by men. The day tents are in the recreation-grounds, and between the lower part of the men's camp and the public road are the kitchens, stores, tents for the male employees, etc.

"The ground is so fenced as to leave a belt of neutral ground between the public road and land occupied by other persons, and the camp. At the entrance an iron hut has been erected to serve as a stores-reception room, and so avoid the too near approach of tradesmen. A similar but smaller hut has been erected for the gate-porter.

"The hospital marquees are double tents having wooden floors raised upon brick piers. Each tent has a canvas porch, and a detached canvas closet fitted with one of Moule's earth-commodes. They are warmed by steam-pipes and lighted by gas. Each tent affords accommodation for 29 beds.

"The bath-house, which is centrally placed between the males' and females' camp, is a wooden structure on brick foundations, 88 feet long and 21 feet wide.

"It has a separate entrance on each of its four faces for male and female patients and male and female officers respectively, and contains eight baths for males, twelve for females, and four for the staff. The officers' baths are in separate rooms, but the patients' baths are in compartments formed by wooden partitions, 5 feet high at sides, and curtained fronts. Each bath stands in the centre of its compartment, and has hot and cold water laid on, and the wastes discharge over the surface of traps outside.

"Another wooden building, 77x25 feet, at the lower part of the camp, provides accommodation for the kitchen department, the boiler-house, and disinfecting-room, and at the rear of this and connected to the kitchen by a covered way is the store, a building 25x20 feet. The kitchen is fitted with four 60-gallon steam-jacketed boiling-pans, a steam potato-oven, a large gas cooking-apparatus, hot closet, etc. Adjoining is a scullery, fitted with the necessary dressers, sinks, etc., and there is also a cook's stove, fitted with slate shelves, meat-rails, etc. Hot and cold water is laid on throughout this department.

"The boiler-house contains two vertical multi-tubular steam-boilers, one of 12 horse-power and one of 10 horse-power. These are coupled, and supply the steam for cooking, for disinfecting, for warming the tents, and for heating the water. There is also a steam donkey-pump for feeding the boiler.

"The disinfecting-room is fitted with two of Lyons' disinfectors, in which the necessary heat is applied by means of dry steam at high pressure. The laundry-work is done at the Imbecile Asylum, where the female officers' laundry and a portion of the female patients' laundry have been temporarily separated by brick walls from the remainder of the building. The linen, before it leaves the camp, is thoroughly disinfected, and it is then conveyed in a closed galvanized-iron tank on wheels to the laundry.

"The discharge-room is another wooden structure, 80x20 feet. A patient about to be discharged enters by a door facing the camp into the stripping-room. To the right of this is a room for camp clothing, and to the left two bath-rooms. The patient enters the bath-room on one side, takes his or her bath, and passes out on the other side, clean and non-infectious, into a dressing-room adjoining, which is a store for new clothing. Having dressed, the patients leave the building by a door facing away from the camp, and enter the conveyance which takes them to the wharf opposite the ship 'Atlas,' from which they were re-

ceived. They will not, however, again enter the ship, but will be reconveyed to London in the managers' steam-vessel, the 'Red Cross.'

"It should be mentioned that the steam-supply from the boilers is carried through the camp by 2-inch mains, each tent having a separate service and stop-valve for regulating the heat, and the two mains are finally led into the hot-water tank. A condense-main brings back to the boiler-house the water arising from condensation in the heating-coils, etc., which is used again in the steam-boilers.

"It remains for us to speak of the sanitary arrangements. It has been mentioned that each tent is supplied with a Moule's earth commode, but these are intended for night use only. Fourteen sets of Moule's apparatus have been fixed in four groups in the recreation-grounds, with the necessary portable tanks. As a considerable quantity of dry earth is required for these, a drying-shed has been erected and fitted with a suitable drying-furnace. The soil from the commodes thus dealt with is buried, and the waste-water and slops of all kinds are disposed of by sub-irrigation, the main-drain having been formed on the side of the hill facing the asylum."

PRIVIES.*

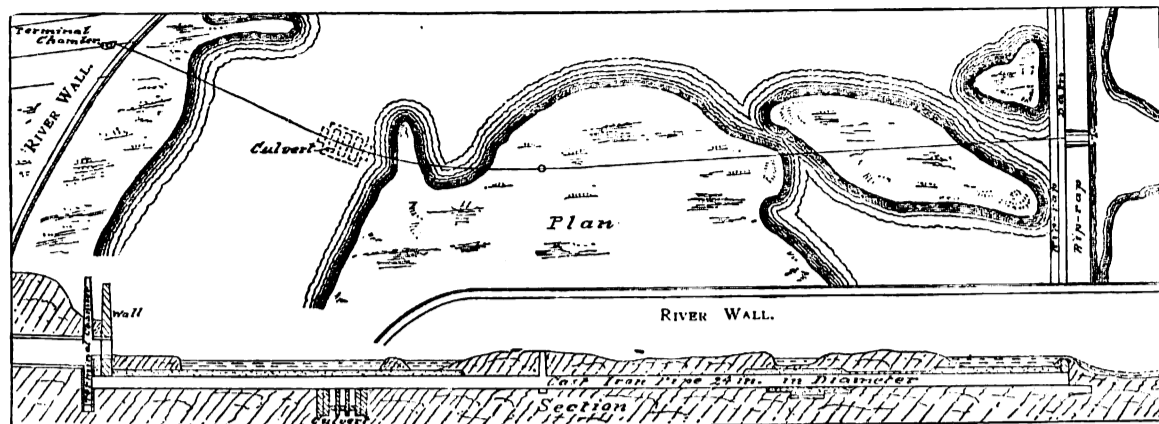
THESE are of four kinds: First, the simple excavation in the earth, either with or without sides of plank or loose stones, so constructed as to facilitate the soaking away into the surrounding soil of the liquid portion of the filth, and thus avoiding the too frequent demands upon the purse of the owner in their emptying. The earth about such vaults soon becomes saturated with the excrementitious matter deposited in them, and these impurities are by the "ground water" carried further and further into the soil, there to decompose and give off pernicious gases, to find their way by percolation into the neighboring well to pollute the water therein contained. It has been frequently observed that when the cobble-stone privy-vault is being emptied, the excrement which was forced into the interstices between the stones when the vault was full oozes back again into the vault, thus showing that this ground soakage is not an imaginary evil.

It is quite a prevalent idea that such vaults are unobjectionable, because it is said that earth is a disinfectant, and that such vaults are practically earth-closets. It is hardly necessary to say that this claim cannot be sustained. The analogy between the yard-vault and the earth-closet would be more exact if in the earth-closet the same earth were used over and over again. This we know cannot be done, as when it is once saturated its deodorizing power is exhausted.

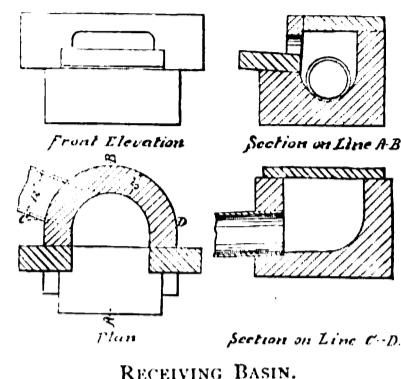
Another kind of vault is what is commonly denominated the "water-tight vault." This is similar to the one just described, save that it is constructed on sides and bottom with bricks laid in cement. This method of construction is adopted to prevent the ground-soakage referred to. But another evil arises which is equally objectionable. The bricks being porous absorb the faecal matter, and when these vaults have been in use a few months they become extremely offensive, and no amount of cleansing can deodorize them. If it should chance that infected discharges, as from a typhoid or choleraic patient, formed a part of their contents, what is there to prevent the spongy sides of these vaults becoming infecting centres in the propagation of these diseases?

A third kind of vault is one which, constructed like that last mentioned, is in addition connected with the sewer. This sewer-connection is of little use, for in most cities the use of water is restricted, and in some none of the waste-water from the dwelling is permitted to discharge into the vault, for fear that stop-cocks will be opened, and water allowed to run to waste in attempts to wash out the vault when it becomes offensive. The only water, then, which finds its way into such vaults is the rain-water from the roof of the building, which is discharged into them by the leaders. In wet seasons, even this is not sufficient to flush them properly, and in the summer months, when for many weeks but little rain falls, the excrement is not carried into the sewers, but accumulates as in the other kind of vaults. Indeed, the rain-water is rather a disadvantage than otherwise. Not being sufficiently abundant to flush the vault, it yet supplies moisture, one of the conditions to the putrefaction of the organic material contained in the vault.

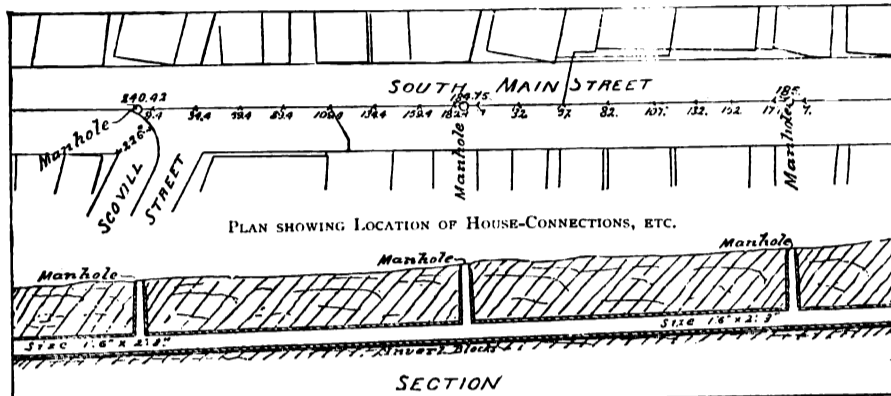
*An extract from a paper read by Dr. Joseph H. Raymond, Commissioner of Health for Brooklyn, at the last meeting of the American Public Health Association at Detroit.



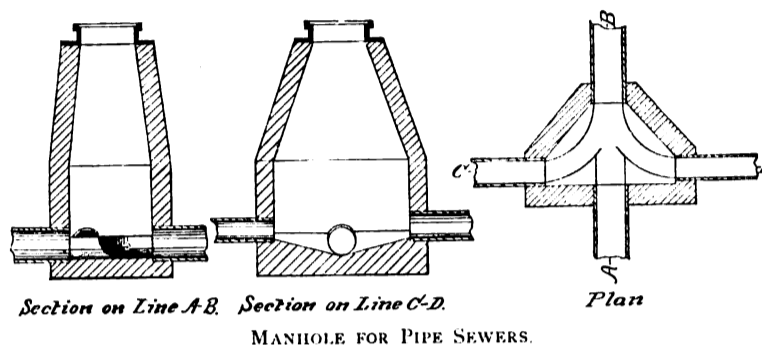
OUTFALL SEWER.



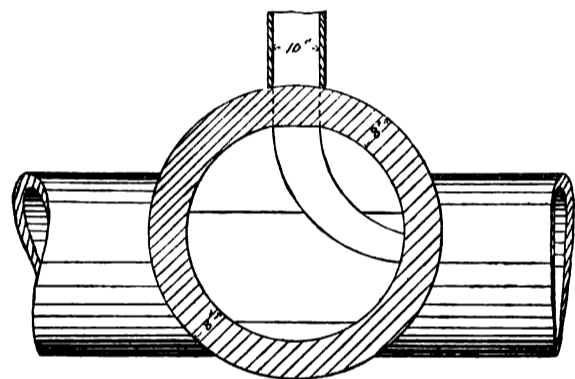
RECEIVING BASIN.



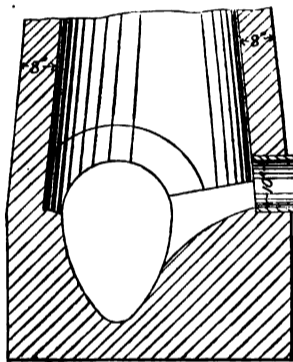
SEWER DISTRICT C.—SOUTH MAIN STREET.



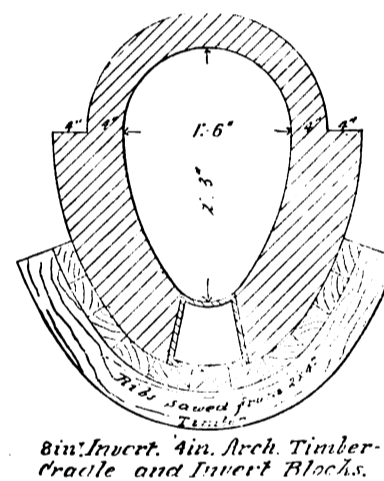
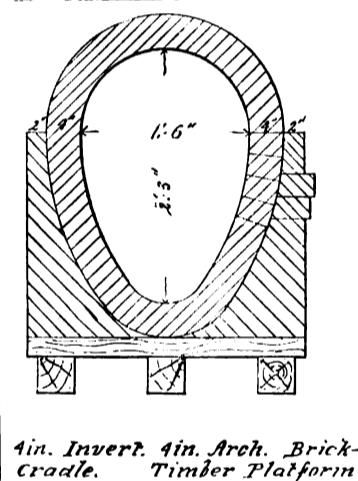
MANHOLE FOR PIPE SEWERS.



Plan of Single Junction Manhole



Transverse Section

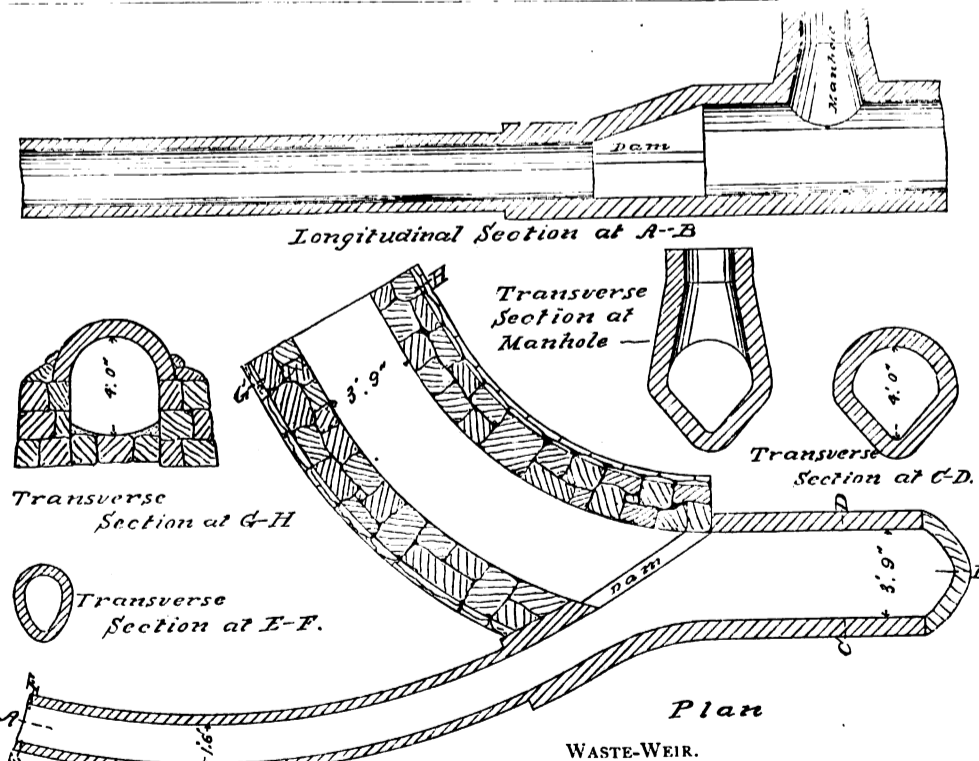


SEWERAGE OF WATERBURY, CONN.

IN view of the fact that during the past year the city of Waterbury, Conn., entered upon the construction of a system of sewers, and expended nearly \$100,000 in building a portion thereof, a brief description of the system, what has been accomplished, and what we intend to do, may be of interest to your readers.

Waterbury has a population of about 25,000, and is situated on the Naugatuck River, some 30 miles north from Long Island Sound. It has a good supply of water from city works, and has until now built no sewers, save one or two private ones. The system under construction was designed by Rudolph Hering, C. E., and the work done has been under his immediate supervision.

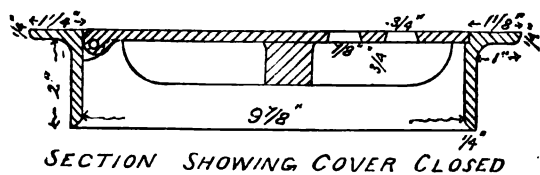
The outfall-sewer is in the Naugatuck River, just below the thickly-settled portion of the city, and is 24-inch cast-iron pipe, 600 feet long, laid in the bed of the river, and discharges below a dam three feet high. Since this pipe, being laid with a concrete foundation and protecting envelope, would make a dam across the channel at one place, it was necessary to provide for a continual flow of water at low stages of the river in summer, to supply a manufactory below. To accomplish this a culvert of masonry was built under the pipe and fitted with gates. These gates are horizontal, and are ordinarily closed at about the level of the bottom of the channel, but can be raised, making a free course for the water when the river is low. At the upper end of the iron-pipe sewer is a chamber, which receives the discharge of the main brick sewer, 2'10"x4'3" diameter. This chamber has the brick sewer for an inlet, the iron pipe as an outlet for sewage 3½ feet below the brick sewer, and a brick overflow for storm-water, discharging directly into the river. Following up the brick main 1,600 feet from the terminal chamber, we find two branches, one to the right



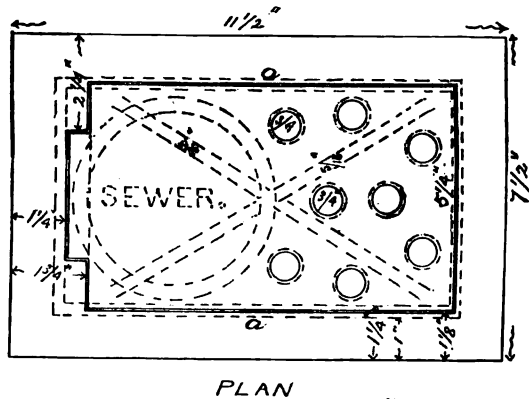
WASTE-WEIR.

being 1'6"x2'3" in diameter, running up into the centre of the city, and designed to carry sewage and roof-water only, and one to the left 1'6"x2'3" diameter, which brings the sewage and some storm-water from the western and north-western part of the city. On the left branch, 2,600 feet

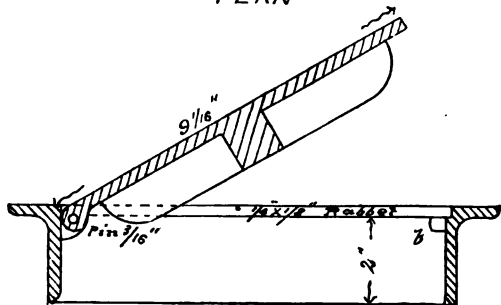
further up, is another overflow, where a storm-water sewer, 3'9"x4'0" in diameter, joins this branch. From here on, for a distance of 2,400 hundred feet, as also in another section of the city, the sewer varies in size from 3'9"x4'0" to 1'6"x2'3", and is designed to carry both sewage and street-water.



SECTION SHOWING COVER CLOSED



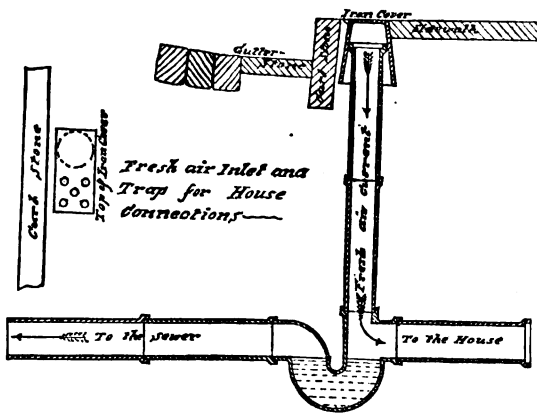
PLAN

SECTION SHOWING COVER PARTLY OPEN
COVER FOR FRESH-AIR INLET—ENLARGED VIEW.

Cast-iron resting on a cast-iron box, 18 inches deep, fastened to same by screws or pins at *a, a*, through flange-lid to be fastened down by screw through lug at *b*.

Catch-basins are built of brick, with substantial granite covers and iron traps, and are $4\frac{1}{2}$ feet in diameter and 8 feet deep. These are placed at street corners, and in the middle of long blocks, and at several places where it was necessary to take in small brooks. The city is intersected by two large brooks, and wherever these could be conveniently turned into the sewers, inlets with movable gates were built, and will be built in other places to utilize the water for flushing purposes. It is intended, also, to use the brooks as feeders for flush-tanks placed at the heads of some pipe-sewers. Timber foundation and cradling was used in many places, water and quicksand being very often met in the excavations; and to facilitate the removal of the ground-water, as well as to make a smooth surface for the invert, vitrified invert-blocks were used. These blocks were also placed in the inverts on steep grades, even where no water was found. Manholes with iron steps and perforated iron covers were built at intervals of about 150 feet. Under the covers are hung galvanized-iron pails to catch what dust and mud may fall through the perforations. All junctions of lateral-sewers are made at manholes, and the change of direction where a lateral pipe-sewer meets the main is all made in the manhole; the top of the pipe being placed level with the top of the main, and the curve in the manhole having a radius of three feet, and all the fall possible. At several places the manholes are so constructed that the current of sewage can be turned in two or three different directions at pleasure. A number of sewers of 8, 10, 12, and 15-inch vitrified pipe were built, and were laid as true to line and grade as it is possible. Each length of pipe was set from a line, and the bottoms of the inverts form a continuous grade line. Junctions of brick sewers are made with curves of large radius, and great care has been taken to preserve the tongue formed by the intersection of the inverts, working it out as far as practicable in brick, and then smoothing and shaping it with cement.

The grades here usually are steep, from 0.5 per cent. to 6.5 per cent. or more; but one main has a grade of only one foot in 1,000 feet, and the iron pipe has a fall of six inches in 600 feet. As yet only two flush-tanks have been placed in position—one of these is Field's and the other Vibbard's. Record maps of streets, showing sewers, houses, location of branch-hubs for laterals and house-connections, are made, and all information relative to the size and depth of sewers and connections made is shown upon them. Rules governing



the making of house-connections, laying of pipes, plumbing and ventilation of house-drains have been submitted to the Common Council for adoption as an ordinance, and although they are not in the shape of an ordinance as yet, we are working under them in part as rules adopted by the Board of Sewer Commissioners. Let me say, in closing, that the iron outfall-sewer is aimed at a low-lying, level stretch of sand and gravel on the bank of the river below, and it is intended some time to lead the sewage there for disposal in some manner, either by filtration, precipitation, or some other means. Inclosed find also some sketches of various features of the work.

F. FLOYD WELD, City Engineer.

SUBWAYS FOR GAS AND WATER-MAINS.

MR. FREDERICK ROGERS, an Englishman, attacks the system of burying gas and water-pipes underground as being destructive to the pipes, and a nuisance from the consequent necessity of street openings. He proposes subways as the substitute, and describes that under the Holborn Viaduct, Farringdon, which is nearly $2\frac{1}{2}$ miles in length.

This subway is a corridor 7 feet wide and about 14 feet high to the crown of the semi-circular arched top, the whole lined with gault bricks. From these main corridors there are branches to the various streets, of smaller dimensions, being so constructed because they have a lesser number, or a smaller diameter of pipes to accommodate. The two main corridors have each two gas and water-mains, one being on the level of the floor, and the other carried upon strong iron brackets. From the water-mains the various branches for the side streets, and the supplies for the houses above, and the street services for cleansing, and fire hydrants are attached, and also the gas-mains. The number or description of the building to be served is marked on the wall, with appliances for turning off the gas immediately in case of necessity. All the valves and other appliances can be easily and readily examined and kept in order; also, of course, the joints of the pipes. Above the gas and water-mains are placed the electric-telegraph, the telephone, and the electric-lighting wires, each service being separately marked, and also the name and descriptions of the buildings they enter. All the conditions and difficulties of an ordinary subway have here been met and conquered save one, and that is the entry. In the viaduct subway, there being a road at a lower level (Farringdon Street), you can easily ascend by flights of steps, and from these entries materials for repairs of alterations can be readily taken in. But in the case of a subway that was entirely underground, enlarged manholes for the entry of men and material would have to be constructed. To compensate, however, for one difficulty the less, there is the experience gained of carrying the gas, water, and other services into various levels. The sewers in the Holborn Viaduct do not enter into the description, as they run far below the level.

The system above described would seem to be almost perfect; indeed, so far is it in advance of the ordinary plan, that no comparison can be advanced. Nor would the cost be so very alarming if all the collateral savings it would effect were taken into account. We have roughly estimated this as for one lineal yard of subway, 6 feet wide by 9 feet to the crown of the arch, which would be of sufficient size for all ordinary street requirements, and an average depth of 10 feet below the street level to the crown of the arch. The brickwork is taken at $1\frac{1}{2}$ bricks thick, set in cement, and bedded on cement concrete:

$\frac{3}{4}$ rod of brickwork reduced, in cement, at £30..	£11 5 0
22 yards cube digging, part fill in and ram, and cart surplus, including strutting, at 8s.	8 16 0
Centering.....	0 10 0
7 yards cube cement concrete, at 10s.	3 10 0
Proportion per yard for brackets, and extra expense for manholes and gratings.	1 10 0

£25 11 0 (\$127)

In this cost of (say) £25 10s., the best material has been calculated for. One-third of this might be saved if concrete walls were used, with segmental-headed arched-top, or (most undesirable) iron girders and plating; but as this work when done should be well done, and made to last, small economies would not be in place. We will, therefore, take the amount of our estimate as the proper cost per yard. This, at 5 per cent., would be £1 5s. 6d., for interest upon the outlay; or, as we did not include the cost of superintendence, repairs, and other sundries, let us put the income that should be derived at £1 10s. If this be divided among the various companies that would use the subway, it should be, per yard—

Gas company	7s. 6d.
Water company	7 6
Telegraph company	5 0
Telephone company	5 0
Electric-lighting company	5 0
	30s. 0d. (\$7.50)

In the above estimate, it will be noted that the sewers are not mentioned as being built in connection with the subway. This has not been done, because in the main roads the sewers have been already laid, and they are in most cases at too great a depth to co-operate with the subways. But in the formation of new roads this can be reckoned as making a large deduction on the comparative cost. And in the balance see what, in the first place, the companies would gain by this outlay. Their material would last twice as long, because it could be properly looked after, and the "stitch in time that saves nine" can be put in. Not only so, but not being subject to the moisture of the soil, it would not decay so soon. The expense of breaking up the roads for repairs would also be saved, and then—last, but not least—O! powerful companies, your customers would have restored to them the use of the roads. —From *Building and Engineering Times*.

ANY one who has been in one of our suburban towns when the outbreak of small-pox has been reported, knows the dread which the great majority of the inhabitants feel at the thought of any stricken member of their family going to the public small-pox hospital. To overcome this feeling, if possible, the Board of Health of Pittsburg, Pa., has had the statistics of small-pox cases in the years 1875 to 1882 carefully gathered, to show the relative mortality under treatment at home and in the Municipal Hospital. In the years named there were treated in the hospital 818 cases; the deaths were 271, or a percentage of 33.13. In the same years 2,382 cases were treated at home, and 974 died, or a death-rate of 38.82 per cent.

IN order to prevent the spread of contagious diseases through the public schools, the Committee on Law will report to the Philadelphia Council an ordinance punishing with a fine of one hundred and fifty dollars any parent or person in charge who sends a child to a school from any house where a contagious disease has existed, before at least ten days have elapsed since the disinfection of the house.

WHEN families of careless habits look around to discover the cause of the bad taste of their drinking-water they sometimes find strange things. We have ourselves known of the sink waste-pipe being turned directly into the cistern which supplied the sink-pump, so that a very perfect circulation for the kitchen slops was provided. Luckily the family did not commonly use this water. It is not a rare occurrence that a rat is drowned in a cistern, but probably that vessel is not usually employed to drown kittens. This, however, did happen in a house in Kensington, England. Several mild cases of diphtheria led to an investigation and the cistern was examined. In it were found the bodies of several kittens tied together.

AROUND the ordinarily harmless path of the diluted-beer drinker dangers are gathering, as appears from the report of Dr. Cyrus Edson to the New York City Health Department, of the discovery of verdigris on the inside of brass beer-keg faucets—"enough to kill a dozen men."

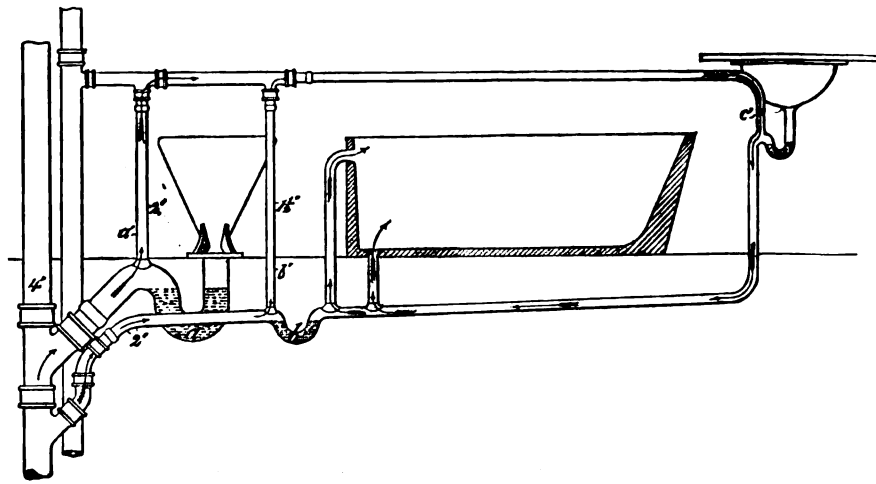
THE London Chamber of Commerce held a meeting June 4, for the formation of a "Section on Preserved Foods and Canned Goods."

UNDER leadership of President Holt, the Louisiana State Board of Health has called upon the Governor to extend the proclamation of quarantine, issued May 1, so as to require forty days' detention of vessels coming from the suspected ports.

FAULTY VENT-CONNECTIONS.

ON the week ending June 7, the Assistant Sanitary Inspector for the district reported to the Health Department of New York City that in five houses in West Seventy-First Street he had discovered that the method of piping pursued in the bath-rooms had formed a "by-pass." Apparently the work was all right when examined in detail and had escaped the plumber's notice for that reason, as all the traps had their vent or "back-air" pipes. But when taken as a whole by a person looking for the possibility of a "by-pass," it presents the feature of having a continuous and direct opening with the house-drain, as can be seen by following the arrows from the 4-inch soil-pipe the waste and overflow pipes of the bath-tub.

The reason for this was that the plumber should have put an S, or other suitable trap, under the bath-tub, but the room being insufficient for a deep trap of any kind, he used a running trap in the waste-pipe, as shown, not seeing that change of position of the trap made a direct unsealed connection with the pipe C.



TRAPS RENDERED OF NO USE BY IMPROPER VENT-PIPE CONNECTIONS.

Correspondence.

PRACTICAL EDUCATION FOR PLUMBERS.

LONDON, May 29, 1884.

To the Editor of THE SANITARY ENGINEER.

LAST evening was held the examinations, under the direction of the City and Guilds of London Institute, for the advancement of technical education.

These examinations are held annually and medals, money-prizes, and certificates are awarded to those who are successful. There are thirty-four subjects in which students are examined, and the whole of them are held on the same night at the various centres in London, and also at several other places in the provinces, including Scotland and Ireland.

The various subjects are taught at science schools, but the greater number of the students being those actually engaged in the industry to which the examination refers, and who cannot attend a day school, attend lectures in the evening given by registered teachers of the above institute. These teachers are mostly practical men who have succeeded in their own examinations with honors, so that the authorities feel justified in registering them as being fully qualified to instruct others. Most of the teachers hold, in addition, two or three science certificates, granted by the Science and Art Department at South Kensington.

Plumbing is one of the City Guild's subjects, and from the correspondence that I have seen in THE SANITARY ENGINEER on this kind of matter, I thought that the subject would perhaps be of interest to your readers. May I be allowed to pay a humble tribute to your valuable paper by saying that I have found it to be of very great assistance in my class teaching, and that a great many students also prize the information it gives? If any one would take the trouble to read the paper of questions* and then some of your numbers, he would see for himself, and so more readily appreciate the value that should be attached to THE SANITARY ENGINEER as a text-book.

Mr. W. Eassie, C. E., is the examiner of plumbers' work for this year. Yours respectfully,

REGISTERED TEACHER.

"HYGIENE."

FT. WAYNE, IND., May 28, 1884.

To the Editor of THE SANITARY ENGINEER:

Will THE SANITARY ENGINEER please define the word "hygiene"? I would like to know whether it means perfect health, or the laws that maintain health, or if it is applied sanitary science, and oblige J. M.

[In his introduction to "Buck's Hygiene," Dr. Billings remarks that "the fact that many definitions have been given of hygiene, no one of which has proved entirely satisfactory—except, perhaps, to its author—shows that it is one of those terms in the definition of which vague and undefinable words must be used, and also that it is still imperfect and incomplete, thus necessitating a corresponding incompleteness in its description. The usual definition of hygiene as being 'the art of preserving health' is defective, since it is more than an art. It aims to increase and improve as well as to preserve; and the word 'health' is too vague to be of much value in this connection."

Accepting this statement as correct we may say that hygiene does not mean health, that it has both a scientific and a practical side, and that as an art, or, as our corre-

* For want of space we are obliged to omit the examination-paper this week. It will be published in the next issue.

spondent expresses it, as "applied sanitary science," it includes all measures which tend to avert, diminish, or destroy the causes of discomfort, pain, sickness, and death.]

SELLING STEAM BY WEIGHT.

THE following extracts are taken from a paper read by Charles F. Emery, Ph. D., of the New York Steam Company, at the May meeting of the American Society of Mechanical Engineers, at Pittsburg, Pa.:

* * * We commenced selling steam in February, 1883, at a specified price *per 1,000 Kals*, explaining that a *Kal* was equivalent to a pound of water evaporated into steam, and thereby solved the problem for our special purposes. * * * The word "Kal" is, of course, based on caloric, a relic of the material theory of heat, and like "calorimeter" from the same source, is designed to represent a measure of heat; each pound of water at a certain pressure taking up a definite quantity of heat. The short word *Kal*, spelled as it is with a *k*, need not be confounded with the French *calorie*, or thermal unit.

The pressure at which the pound of water is evaporated is not of great practical importance. The number of thermal units derived from the fuel with a temperature of feed of 100° is less than 3 per cent. greater when evaporated at 70 pounds pressure than when evaporation takes place at atmospheric pressure. * * *

It will be observed that the charges for heating are based on the ordinary steam-fitter's method, using the *capacity* of the buildings, instead of the area and thickness of walls, area of windows and roof, extent of ventilation, etc. These rules are founded upon investigations of the cost of heating a large number of business buildings in the city of New York, under actual practical conditions. The variation in cost between different buildings of similar construction and exposure were found to be very great, due doubtless to differences in apparatus and management, and made useless any elaborate system based on calculating the number of thermal units passing through window-glass or walls of different kinds and thicknesses. These rules, when applied of course with good judgment, simply give prices for which business buildings of the kind described should be heated satisfactorily during the ordinary business hours of an average heating season, say 10 hours per day for 200 days in the year. With care the work can be done more cheaply, but when the steam is used from a district system where pressure is maintained continuously, janitors and porters will use the same prodigally by leaving it on day and night, or by neglecting to shut off radiators so as to properly graduate the heat to the demand, thereby increasing the cost in some cases very materially. * * *

THE NEW YORK STEAM COMPANY.

Rules to be observed in making estimates by the Division of Steam Supply:

Offers, estimates, and contracts may be made for a stated price, but must in every case contain a reservation of the right to apply meters, as given in the regulations. Regular meter-rate to be 60 cents per M. Kal. In contracts for considerable amounts 50 cents per M. Kal will answer when the consumption can be accurately ascertained.

HEATING.

Estimates for heating will be based on the capacity of the rooms heated, and the following rates, varied by judgment, according to exposure, temperature, and use of the rooms and the amount of ventilation.

Maximum rate, \$2.50 per 1,000 cubic feet per season for deep buildings with minimum exposure, or fairly well-lighted rooms used as workshops for manual labor, when the heating surface is limited or so divided that it can be regulated to use small portions at once. Office buildings, well-lighted, generally require \$3 per M. cubic feet; buildings with large windows about \$4 per M. cubic feet, and those with unusual exposure and good ventilation \$4.50 to \$5 per M. cubic feet.

Cost of heating estimated from heating surface:

Steam	20 lbs.	.6	Kals per sq. foot
Pressure.	40 lbs.	.7	of heating sur-
	80 lbs.	.8	face per hour.

For steam tables, etc., augment actual surface of table and uncovered pipes reasonably to allow for food, cover, moisture carried off, etc.

Charge for uncovered pipes in basements full time, day and night.

Ordinary heating season, 200 days of 10 hours. Allow about 5 days per season steam on one-fifth surface all night.

With ordinary heating-apparatus it is supposed the radiators will, on the average, be shut off at least half the time allowed for heating.

For dry rooms special calculations are necessary, founded on the conditions of the particular case. The steam required will vary principally with the quantity of air circulated, and the weight of moisture carried off. A steam-meter or some arrangement to measure the water to be applied in every case of this kind.

BOILER EXPLOSIONS IN FRANCE.

WE find in the *Ingénieur*, taken from official statistics, some figures on the boiler explosions in the year 1883.

There were seventeen explosions, resulting in the death of forty, and the serious wounding of twenty persons.

These explosions may be classified:

Boilers with exterior hearth, horizontal, with or without tubes: Eleven; seven persons killed, six wounded.

Vertical boilers with exterior hearth: Three; seven killed, one wounded.

Horizontal boilers with interior hearth, without tube: One; three killed.

Horizontal boilers with interior hearths and tubes: Eight, seventeen killed, eight wounded.

Vertical boilers with interior hearth: Two; one wounded.

Reservoirs: Nine; three killed, three wounded.

Miscellaneous: Three; three killed, one wounded.

The causes of these explosions are thus given: In ten cases they were attributable to poor construction, defective material, neglected repairs; in fifteen cases they were brought about by the deterioration and the wear of the material; in seven instances they were owing to poorly made repairs; five were caused by neglectful attendance—want of water; six by too great pressure; four are classed among the miscellaneous, and in two cases the cause remains unknown.

MARCUS KEMPNER was fined \$250 in the Court of Special Sessions of this city, May 28, for maintaining a defective privy-vault on the premises 239 Henry Street, in this city, after being repeatedly notified of its condition by the Health Department.

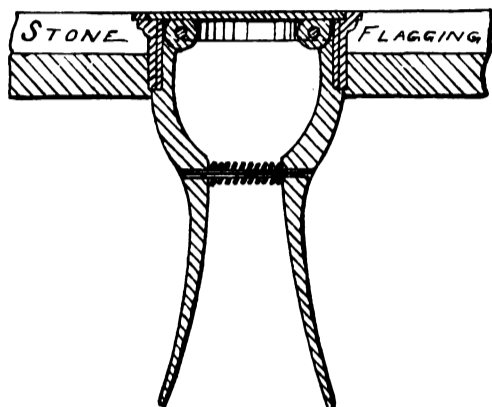
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

MANHOLE COVER FOR SIDEWALKS, ETC.

OUR sketch shows a novel form of a coal-shute or man-hole cover, or more particularly the method of fastening it, employed by a London company.

The upper portion of the plate is of the ordinary kind, but below it has hinged to it two curved arms, which are



kept apart by a coiled spring. A ring is fixed in the flagstone or sidewalk, under which shoulders on the arms engage when the plate is dropped in place.

It is claimed for it that it cannot be raised by burglars without attracting the attention of the police, and that under no consideration can it be displaced by accident. To remove it, the operator must be underneath; when the two handles may be pressed together, relieving the shoulders from the ring, when it may be pushed upward.

The manufacturers are the Self-Fastening Coal-Plate Company, London, E. C., England.

DIPHTHERIA AT TICHMARSH.

UNDER date of March 8, 1884, Mr. W. H. Power has made a report to the local Government Board of England, on an outbreak of diphtheria in Tichmarsh, a village of about 900 inhabitants, two miles from the town of Thrapston. From the middle of May, 1883, to the beginning of February, 1884, there were 19 deaths from diphtheria in this place, 18 of them being children under 13 years of age. Mr. Power could learn nothing with certainty as to the origin of the disease or as to the modes of its propagation. There was no satisfactory evidence that the school was the essential factor of spreading the disease, although Mr. Power is of the opinion that the school attendance was a factor, although largely subordinate to some other and more essential factor of diphtheria. He alludes to the fact that "foot-and-mouth disease" was prevalent in the village concurrently with the early diphtheria, and that it has been surmised that there might have been some relation between the two affections, but at this time the "foot-and-mouth disease" affected a very wide area, whereas the diphtheria was strictly limited to Tichmarsh.

The place is not sewered. The excreta is disposed of by privy-vaults constructed with reference to the soakage of their fluid contents into the soil. The water-supply is from wells, the water of which appears to be of very doubtful quality.

In regard to the construction of privies recommended by the Officer of Health, it is mentioned that the school authorities set a bad example by declining to accept his recommendations to remove the school privies to a distance from the house, and to reconstruct them as earth-closets. They preferred to convert their receptacles into a huge tank, to be flushed with water led from a ditch at the rear of the school, and to be discharged once a week through a pipe opening into another ditch at a lower level. The result seems certain to be a nuisance, whatever may be its effects on the origin and spread of diphtheria.

Evidently the school authorities in Tichmarsh are like many school authorities in this country, in being wise in

their own conceit, and at the same time knowing nothing of sanitary matters.

MILK FROM DISEASED COWS.

ON Tuesday the 10th inst. the Department of Health of New York City secured the conviction of Louis O. Meyer, of Blissville, L. I., in the Court of Special Sessions, before Judges Kilbreth, Smith, and Gorman, for bringing milk, from distillery-swill-fed cows at Blissville, into the city and disposing of it.

The facts in connection with the case and those elicited on the trial are as follows: Through investigations of the State Board of Health, Commissioner Raymond, of the City Board of Health of Brooklyn, became aware of the condition of the Blissville cow-stables and how the cows were fed, and suspected that the milk was disposed of in Brooklyn. He subsequently found that it was forwarded to New York, and informed the Department of Health of this city of his suspicions.

To secure the evidence necessary for a conviction, Dr. Edson, Chief Sanitary Inspector, and Dr. White, with Dr. Bartley of Brooklyn, visited Blissville and the stables, in one of which they found twenty cows and in another about eighteen, standing as close together with their heads between posts as they would be likely to be in a vessel for ocean transportation. There was plenty of circumstantial evidence to show the cows were *swill-fed*, as a large tank stood at one end of the stables in which was swill, with troughs leading from it to the rows of cows. But the proprietor stoutly maintained that it was for hogs which were let run in the gangways between the cows. This did not satisfy the physicians, who returned the next day unexpectedly and found the cows in the act of being fed on the swill, which was let run in sluice-boxes to the troughs.

An examination of the cows developed the fact that one had tuberculous consumption, and three pleuro-pneumonia, while all were emaciated and some had their tails rotting off. The consumptive cow has since died.

As this was out of the jurisdiction of the Health Department of New York City, the inspectors watched the ferries and succeeded in arresting Louis O. Meyer, the dispenser of the milk and the brother of the man who runs the stables, charging him with bringing milk from swill-fed cows into the city.

The court imposed a fine of five hundred dollars; but in view of the fact that the physicians examined were of the opinion that blood-poisoning and perhaps consumption were likely to result from the use of such milk, we regret exceedingly that the court did not see fit to impose the alternative of imprisonment, as wealthy scoundrels pay their fine, and generally go on with their villany.

WORK OF THE PARIS MUNICIPAL LABORATORY.

THE following is a list of the principal food articles analyzed in the Municipal Laboratory of Paris during the month of April:

	Total No. Examined.	No. Re- ported as good.
Wines.....	671	99
Vinegars.....	19	4
Beers.....	9	6
Ciders.....	5	3
Alcohols and Liquors.....	4	1
Syrups.....	7	1
Waters.....	17	5
Milks.....	412	289
Butters.....	30	25
Oils.....	8	3
Flours.....	15	11
Meats.....	2	2
Preserves.....	23	23
Peppers.....	10	7
Coffees, Teas, etc.....	26	14
Chocolates.....	15	8
Jams.....	5	2

ANALYSIS OF CLARET BY ELECTROLYSIS.

A NEW method of analysis, which may prove of considerable value in the testing of red wines for artificial coloring matters, is given by M. Krohn in *La Nature*.

If an electric current, one of two Bunsen elements will answer, is passed into 5 or 10 c.c. pure claret, diluted to six times its volume with water and acidulated slightly with

cinc-sulphuric acid, there will soon appear, at the positive pole, a deposit of red scales.

These scales are already characteristic to the naked eye, and on examination with the microscope prove still more so; they then present a web-like appearance. The strength of this web depends on the length of time that the current has been passed; if this has been done for some twelve hours or more the web is quite tough and strong. During electrolysis the odor of aldehyde becomes perceptible, and the red liquid turns yellow at first, and finally colorless.

To make sure that the phenomenon observed was due to the coloring (and astringent) matter of the wine, the experiment was made on ten samples of pure red wines of different age and quality. In each case the same result was obtained. However, no deposit was obtained whenever the claret was first decolorized by animal charcoal before being submitted to electrolysis. White wines, on being exposed to the current, lost entirely their faint color, but did not yield a precipitate like that given by the red wines under the same conditions.

In subjecting to the same treatment the coloring matters usually employed in the artificial coloring of wines—*aniline-red*, *cochineal*, *Pernambuco*, and *Brazil wood*, the juice of cherries, and others, all dissolved in white wines, it was found that they were discolored, but did not yield any precipitate.

From these investigations it would appear that the electrolysis of red wines, and the microscopical examination of the precipitate obtained, furnish a sure method of distinguishing between the true and the artificial coloring of clarets.

The apparatus needed for this kind of analysis is very simple—two Bunsen elements, the poles of which are joined to two platinum plates, which are placed in the liquid to be examined, will answer. Moreover, several samples can be tested at the same time in the same circuit.

DETECTION OF COTTON-SEED OIL IN OLIVE-OIL.

IN the *Chronique Industrielle* is given the following test of Professor Bechi, of Florence, to detect the addition of cotton-seed to olive-oil.

To five c.c. of the suspected oil add, in a small flask, twenty-five c.c. of alcohol of ninety-eight degrees, and mix well. Then add five c.c. of a solution prepared by dissolving one gramme of nitrate of silver in 100 c.c. alcohol of ninety-eight degrees. Heat on a water-bath to about eighty or ninety-five degrees. Heating with a direct flame must be avoided. If the sample contains cotton-seed oil—even a very small quantity—the mixture will color and take a tint more or less pronounced, according to the amount of cotton-seed oil it contains.

RECOVERY OF BYE-PRODUCTS.

ACCORDING to the *Engineer*, Messrs. William Baird & Co., of Gartsherrie Ironworks, have for several years devoted part of their attention to the recovery of bye-products from their blast-furnace gases. At Gartsherrie and at their Eglinton Ironworks in Ayrshire, these parties have now erected and at work plant for the recovery of the tar and ammonia from the gases of sixteen of their blast-furnaces, consuming about 1,000 tons of coal daily. They manufacture the ammonia into sulphate, and they distill the tar into oils and pitch. The gases at their different works contain ammonia equal to from 20 to 30 lbs. of sulphate, and 200 to 225 lbs. of tar per ton of coal consumed—the yields varying with the qualities of the coals and also with the working of the furnaces. The ammonia and the tar are perfectly taken from the gas, but hitherto various sources of loss have crept in, and the actual yield attained varies from 18 to 25 lbs. of sulphate of ammonia, and 180 to 200 lbs. of tar per ton of coal consumed. The gas after being treated is perfectly clean, is very free from moisture, and as it deposits practically no dust, it is found to be better adapted than before for all purposes of the works—for raising steam, heating the furnace blast, distilling the tar, etc.

LONDON is reported to be alarmed over the great increase of small-pox since last November. In the last five months it is said \$250,000 has been expended for additional accommodations for small-pox patients. While the scourges of vaccination and anti-vaccination have joined battle, and the regular medical practitioners are denouncing the anti-vaccinationists as a chief cause of the spread of the small-pox.

THE CIVIL ENGINEERS AT BUFFALO.

THE annual convention of the American Society of Civil Engineers, held at Buffalo, June 11-13, was an interesting and profitable session of that distinguished body. About 300 members of the society were present. Nearly 200 of these, from New York and the East, went to Buffalo in a special train over the West Shore Railway. The business sessions were held in the new Association Hall, Y. M. C. A. Building. At these meetings the following named papers were read:

"The Humphrey Turbine Water-Wheel," and "Experiments on Submerged Weirs," by J. B. Francis, of Massachusetts.

"The American Line from Vera Cruz to the City of Mexico, with Notes of some other Lines from the Coast to the Plateau," by A. M. Wellington, of the *Railroad Gazette*.

"The Ravages of the *Torpedo Navalis*, commonly known as the Ship-Worm," by P. C. Asserson, of the U. S. Navy.

"Analysis of the Rainfall at Lake Cochituate, Mass.," by Desmond Fitzgerald, Superintendent of the Western Division of the Boston Water-Works.

"Electrical Transmission from Niagara Falls," by Mr. Benjamin Rhodes, Niagara Falls, N. Y.

"The South Pass Jetties; Ten Years' Practical Teachings in River and Harbor Hydraulics," by Chief Engineer E. L. Corthell, of the New York, West Shore & Buffalo Railway.

"Management of Forces Engaged in Railroad-Track Repairs," by Division Engineer Benjamin Reece, of the Lake Shore & Michigan Southern Railway.

"Improvement of the Erie Canal," by State Engineer Elnathan Sweet. (Read by the Secretary, in Mr. Sweet's absence.)

"The Lake Marine," by Capt. M. M. Drake, of the Union Steamboat Co., Buffalo.

"Cost of Steam Power," by Clement Herschel.

"Water-Rates," by J. James R. Croes.

Many other papers were read by title.

In executive session, five members were appointed a nominating committee, who, according to the constitution, are to name candidates for the presidency of the society, who will be elected before January 1 by letter-ballot. They are: General George S. Field, of Buffalo; Mr. Albert Fink, Commissioner of Pool Freights, New York; Mr. George E. Gray, Chief Engineer of the Southern Pacific Railroad, San Francisco, Cal.; Mr. Thomas C. Keefer, Engineer, Ottawa, Ont.; and Colonel Henry Flad, of St. Louis.

The Committee on a Uniform System for Tests of Cement, reported progress.

Mr. Sanford Fleming, of Ottawa, of the Committee on Standard Time, read a report in brief, the full text of which was in pamphlet form in the hands of the members. It created much interest, which resulted in the offering, by Mr. William E. Wortham, of the following:

"Resolved, That a memorial be addressed to the President of the United States, setting forth the substance of the report of the Committee on Standard Time, and suggesting that the railway and other important interests of which the society is in some means the exponent, should be represented at the Washington International Conference, to fix and determine a prime meridian, by the appointment of the President of the American Society of Civil Engineers as a member of such conference."

The resolution was unanimously adopted.

Subsequently, the following was adopted:

"Resolved, That should the President of the United States select the President of this society to be one of the representatives at the International Conference at Washington, in October next, to decide upon the best prime meridian and best method of counting standard or cosmopolitan time, he is not to be considered committed by any action of the society heretofore made by advocating the commencing of hours from either midnight or noon."

The visitors were generously entertained by the business men of Buffalo. They were given a reception at the Buffalo Club, a tour of local engineering and other improvements, and made excursions to Niagara Falls, the Canti-lever Bridge, Falconwood (a resort on Grand Island, Niagara River), Chautauqua Lake, etc.

Not the least notable incident of the convention was the presentation to each member of the society of a superb souvenir volume, richly printed and illustrated, and bound in an illuminated cover, bearing appropriate designs, from the presses of Matthews, Northrop & Co., Buffalo.

WATER-SUPPLY IN NEW JERSEY.

IN the annual report of the Commissioners of State Water-Supply of New Jersey, which was noticed in THE SANITARY ENGINEER of April 17, 1884, the commissioners stated that the greater part of the funds appropriated for their use had been expended in making examinations into the capabilities of the Passaic River Basin, for the storage and collection of pure water for the cities and towns necessarily dependent upon it for supply. The results of the examination are embodied in two reports submitted on March 17, one by Mr. Lebbeus B. Ward, the engineer member of the commission, and Mr. William E. Worthen, their consulting engineer, giving the details of the projected scheme for a co-operative water-supply for the towns in the eastern part of the State, and a more elaborate discussion of the subject by the commissioners themselves, which they submit "with the belief that the importance of the subject will warrant a careful examination by the Legislature of the whole subject-matter involved, including the agency by which the work can be most judiciously prosecuted." There is no doubt that the Commissioners' opinions in this respect are sound, but unfortunately the local jealousies which rural legislators bring with them into the General Assembly of the State has prevented, for this year at least, any further consideration of the subject. The investigations of the commission were confined to the northeastern counties of the State, and their expenses being paid by the whole State, a feeling of resentment at being slighted seized the representatives of the rest of the State, and they would neither carefully consider the report nor vote an additional appropriation to carry on the investigations. Technically, perhaps, the Legislature was right and the commissioners in the wrong, because, carried on by their enthusiasm over the grand scheme which had unfolded itself to their minds, they had expended in one year the appropriation intended to last them two years. Actually, however, the commissioners did wisely in having the work done thoroughly and rapidly, even at the expense of having to lie idle for a year before they could resume their investigations, for an examination of this kind can be much more economically and satisfactorily made by prompt and thorough action than by loitering over it with an insufficient force. The local jealousy is unjust in this case, because while it is true that only a few counties of the State are directly interested in the questions they have considered, it is worthy of note that the district interested contains 42 per cent. of the whole population of the State, and is a region which has received but little practical benefit from the State Geological Survey, which is also paid for by the whole State, and has done a great deal to develop the sections which are rich in mineral deposits and manufacturable clays.

It is, moreover, the most densely populated and most rapidly growing portion of the State, and is by far the most urgently in need of some regulation of its water-supply, both as to furnishing and removing it.

The large manufacturing city of Paterson deposits its refuse in the stream whence the larger cities of Newark and Jersey City draw their water. The city of Orange has built water-works of its own on the headwaters of the stream whence Rahway procures its supply, and the result is protracted litigation. For the supply of Hackensack and Hoboken water-works costing nearly a million dollars have been built. The sewage of East Orange and Bloomfield threatens pollution to the water-supply of Elizabeth, already precarious enough. It is therefore high time that the suggestion of Governor McClellan some years ago, for a co-operative scheme of supply to all these towns, should be acted on, and this report is a step in the right direction.

The scheme proposed by the engineers and indorsed by the commissioners is the impounding of the waters of the streams in the upper Passaic Valley in storage-reservoirs, from 370 to 1,000 feet above tide level and 16 to 25 miles distant from Newark. The water from the lowest of these reservoirs it is proposed to convey by a large wrought-iron pipe to a water-tower or stand-pipe at a central point, whence it could be distributed to the several municipalities, the quantity delivered to each being measured.

As no mention is made in the reports of any previous investigations of this subject, it is to be presumed that the conclusions reached by the commissioners and their engineers are the result of original researches unbiased by any prior knowledge of the subject. It is satisfactory, therefore, to find that in all its general features this project coincides with the one described by Messrs. Croes and Howell in their report on sources of additional water-supply for

Newark in 1879, as shown by comparative estimates to be the cheapest for a large supply. The principal storage-reservoirs are in practically the same locations in each project, and the method of conveying the water to the central point of distribution by wrought-iron pipes is the same. The location of the subsidiary storage-reservoirs is generally the same, but some very available sites have been discovered by Messrs. Worthen and Ward, with the aid of the thorough topographical survey of the territory made by the State Geological Survey. Messrs. Croes and Howell estimated the cost of a system of reservoirs and piping constructed gradually as the demand increased from 12,000,000 to 100,000,000 gallons daily, to be \$5,132,535, while the commissioners estimate that works to supply 80,000,000 gallons daily, built at once, would cost \$3,273,720.

The comparisons of the annual expenditures under the proposed system and under a continuance of the present system of several disconnected pumping systems, are very confused in the commissioners' report, and also in the engineer's, and it is impossible to get any distinct idea from them. From the more clearly stated estimates of the report of 1879, it appears that the annual expense of interest and maintenance in the proposed gravity scheme will be only about 60 per cent. of what the continuance of the present wretched system would entail.

The fact that two sets of investigators of this problem, working independently and at an interval of five years, agree in their general recommendations and very closely in their estimates of cost, affords reasonable ground for confidence of the public, that decidedly the best method of furnishing a copious supply of good water to the territory between Orange Mountain and the Hudson River is by gravity from the headwaters of the Passaic; and it is to be hoped that the report of the State Water Commissioners will be so thoroughly studied by the citizens interested that at the next session of the Legislature a positive demand may be made for authority to carry out the recommendations of the commission.

TENEMENT-HOUSE COMMISSION.

THE following is the text of the law creating a Commission on Tenement-Houses in New York City:

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Alexander Shaler, Joseph W. Drexel, S. O. Vanderpoel, Felix Adler, Oswald Ottendorfer, Moreau Morris, Anthony Reichardt, Joseph J. O'Donohue, Abbot Hodgeman, Charles F. Wingate, and William P. Esterbrook are hereby appointed a commission to investigate and inquire into the character and condition of tenement-houses, lodging-houses, and cellars in the city of New York.

SEC. 2. The said Commission shall have power and are hereby authorized to subpoena witnesses and compel their attendance, and to require the production of any books, papers, or documents in the possession or under the control of any person subpoenaed to appear before them. And the chairman shall have the power to administer oaths to the witnesses before the said commission. A refusal to obey the subpoena of the commission is hereby made a misdemeanor.

SEC. 3. The commission shall have power to employ a stenographer. No member of the commission shall receive any compensation for his services. Any vacancy or vacancies occurring in said commission shall be filled by election by the balance of the commission. The commission shall report the evidence, together with their recommendation, to the Legislature, on or before January 15, 1885. The sum of five thousand dollars is hereby appropriated to pay the expenses of the commission hereby created.

SEC. 4. This act shall take effect immediately.

IN the Salford health bulletin, for the quarter ending March 29, 1884, Dr. Tatham reports a mortality-rate equal to 22.4 per 1,000, which is about twenty per cent. lower than the rates of the corresponding quarter for the previous ten years, but is 1.3 per 1,000 higher than the average of twenty-eight great English towns for the same period. The proportion of deaths under one year of age to registered births was 158 per 1,000. Five per cent. of all the deaths were uncertified by any attending physician.

PROFESSOR W. RIPLEY NICHOLS, of the Massachusetts Institute of Technology, has been appointed a delegate to the International Health Exhibition at South Kensington.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JUNE 7, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.							Whooping-cough.		
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.	Measles.	Puerperal Diseases.	Small-pox.			
NORTH ATLANTIC CITIES.																										
Portland	Maine	35,000	17	25.3	6	35.2	1	1	2			1	2				1	1	2							3
Boston	Mass.	435,000	169	20.2	46	27.2	7		42	1	2	13	2				1	11	1	8			1	2		
Lowell	Mass.	71,500	20	14.5	5	25.0			2									3								
Worcester	Mass.	69,000	10	7.5	6	50.0			1																	
Fall River	Mass.	67,000	34	26.4	16	47.0		1	3	1										1	2		1	1		
New Haven	Conn.	69,000	21	15.8	6	28.5		1	4											2						
Providence	R. I.	125,000	41	17.0	4	9.7	5		10						1					2				2		
Total		871,500	312	18.6	88	28.2	13	3	64	2	2	14	2	3	1	4	16	3	11		2	5				3
EASTERN CITIES.																										
Albany	New York	103,000	41	20.7	12	29.2	1		5	1	2	1						3	1	1				1	10	6
New York	New York	1,355,000	630	24.2	254	40.3	31	4	94	10	21	27	2	1	6	10	50	16	20		28			10		7
Brooklyn	New York	670,000	243	18.8	90	37.0	13		39	5	10	3	1	2	2	7	16	2	12		1			4		8
Hudson County	New Jersey	225,000	92	21.3	31	33.6	4	2	14	1	3			2	1	2	8	1	1	1			2			
Newark	New Jersey	154,000	71	24.0	28	39.4	1	2	10	1	1			2	1	1	4	2	2				2			
Philadelphia	Pa.	940,000	354	19.6	133	37.5	26	2	57	3	13	9	4	8	1	14	14	4	5		1	1		1		3
Wilmington	Delaware	50,000	21	21.8	6	28.5	1		2	1				1			1		1							
Total		3,497,000	1,452	21.6	554	38.1	77	10	221	22	50	40	7	16	11	34	96	10	42	1	30	20	1			17
LAKE CITIES.																										
Buffalo	New York																									
Rochester	New York																									
Cleveland	Ohio	210,000	57	14.1	25	43.8	2		3		1	1	1	3	2		1		2		1					
Detroit	Michigan	140,000	53	19.7	24	45.2		1	5	1		7					6	1	1		2					
Chicago	Illinois	650,000	203	16.2	107	52.7	10		19		8	9		5	1	5	9	1	10	2	14	3				3
Milwaukee	Wisconsin	147,000	54	19.1	28	51.8	1	1	6			1		1			5		3		3					
Total		1,147,000	367	16.6	184	50.1	13	2	33	1	9	18	1	9	3	5	21	2	16	2	20	3				3
RIVER CITIES.																										
Pittsburg	Pa.	210,000	72	17.8	34	47.2	6		11			8	1				1	8		3		4	1	2		2
Cincinnati	Ohio	275,600	107	20.2	32	29.9	5		14		3	3		3		4	2	1	4	2			1			
Louisville	Ky.	137,000	40	15.2	7	17.5		1	6	1	2			1	1		4		2		1					
Indianapolis	Ind.	94,000	19	10.5	2	10.5		1	4			2			1		1	1	1			1				
Minneapolis	Minn.	100,000	17	8.8	6	35.2	2	1	1	1		2		2												1
Evansville	Ind.	34,000	20	30.6	12	60.0			2								2	1			2					
St. Louis	Mo.																									
Total		850,600	275	16.8	93	33.8	13	3	38	2	5	15	1	7	2	5	17	3	10	2	7	3	2			4
SOUTHERN CITIES.																										
District of Columbia	Wh.	133,800	47	18.3	18	38.2			5		2	1					2		1							1
	Col.	69,300	39	29.3	15	38.4	1		8	2	1						2	2	1	1		1				
Richmond	Va.	41,000	14	17.7	5	35.7			2																	
	Wh.	32,400	13	20.9	4	30.7			1		2			2					1							
Charleston	S. C.	25,000	10	20.8	4	40.0			1		4							1								
	Wh.	27,800	33	61.8	16	48.4			6		3			1												
Atlanta	Geo.	30,000	17	29.5	10	58.8			2		7										1					
	Col.	20,000	15	39.0	9	60.0			1		2							1								
Augusta	Geo.	20,000	7	18.2	5	71.4					4															
	Wh.	15,000	9	31.2	5	55.5			2									2								1
Nashville	Tenn.	35,100	8	11.8	2	25.0			2																	
	Col.	21,900	5	12.2	2	40.0			1		1															
Memphis	Tenn.																									
	Wh.																									
New Orleans	La.	171,000	84	25.5	49	58.3	5		7	2	21	3	1						1		2			1	8	
	Col.	63,000	78	64.5	29	37.1	3		12		15			2												
Total White		455,900	187	21.3	93	49.7	6		19	2	39	4	1	2	2	3	1	1	1		3				1	1
Total Colored		248,800	192	40.2	80	41.6	3		31	2	24			3	2	2	5	2							8	
Total in 31 U. S. Cities		7,070,800	2,785	20.5	1,092	39.2	125	18	406	31	129	91	12	40	21	53	156	19	82	5	65	31	12		29	
Total in 28 English Cities.																										
May 24.	Total in 28 English Cities	8,762,354	3,343	19.9			112				46	28		37		68										138
" 24.	8 Scottish Cities	1,254,607	539	22.3			26				13	9		13		7								24		33
" 24.	16 Irish Cities	858,666	376	22.8			7		61		4	2		7		5										10
"	134 German Cities																									
"	139 German Cities																									
"	15 Swiss Cities																									

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending June 7, 1884, in 31 cities of the United States, having an aggregate population of 7,070,800, there were 2,785 deaths, which is equivalent to an annual death-rate of 20.5 per 1,000, a slight increase over the rate of the preceding week. In the North Atlantic cities, the rate was 18.6; in the Eastern, 21.6; in the Lake, 16.6; in the River, 16.8; and in the Southern cities, for the whites, 21.3, and for the colored, 40.2 per 1,000. Of all the deaths 39.2 per cent. were under 5 years of age, the proportion of this class of deaths being highest in the Lake cities—viz., 50.1.

Accidents caused 4.4 per cent., consumption 14.5, croup 1.1, diarrhoeal diseases 4.6, diphtheria 3.2, typhoid fever 1.4, scarlet fever 1.9, pneumonia 5.6, bronchitis 2.9, measles 2.3, puerperal diseases 1.1, small-pox 0.4, whooping-cough 1.1 per cent. of all deaths. Consumption caused 20.5 per cent. of all deaths in the North Atlantic cities; diarrhoeal diseases, 20.8 per cent. in the Southern cities among the whites, and 12.4 per cent. among the colored; diphtheria 5.4 per cent. in the River cities; and measles 5.5 per cent. of all deaths in the Lake cities. Deaths from small-pox were reported in Philadelphia, Pittsburg, and New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 32 new cases of diphtheria, 51 of scarlet fever, and 6 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 25 new cases of diphtheria and 13 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 7 new cases of diphtheria and 18 of scarlet fever.

BALTIMORE, MD.—The Health Officer in his weekly report records 134 deaths, including 47 under 5 years of age. The annual death-rate for the whole population was 16.78 per 1,000, or 14.60 for the whites and 20.46 for the colored. Diphtheria caused 4 deaths, scarlet fever 2, measles and whooping-cough each 1, typhoid fever 2, malarial fevers 3, diarrhoeal diseases 10, consumption 17, acute lung diseases 12, and violence 11.

BROOKLYN, N. Y.—Card for week ending May 31 came too late for tabulation in last number. The deaths numbered 206; under 5 years of age, 68. The annual death-rate was 16.6 per 1,000. Diphtheria caused 2 deaths, scarlet fever 9, croup 3, whooping-cough 7, typhoid fever 1, malarial fevers 5, diarrhoeal diseases 4, puerperal diseases 3, consumption 41, pneumonia 7, bronchitis 2, and violence 3.

MASSACHUSETTS.—During the week ending May 31, in 100 towns of the State, having an aggregate population of 1,378,000, there were 437 deaths, equivalent to an annual death-rate of 16.50 per 1,000. The highest rates recorded were 23.2 in Boston and 22.3 in Haverhill. The principal infectious diseases caused 64 deaths, among which were diphtheria and croup 25, diarrhoeal diseases 11, scarlet fever 7, typhoid fever 6, and whooping-cough 6. Consumption caused 79 deaths and diseases of the lungs 37. Of the decedents 128 were under 5 years of age.

NEW HAVEN, CONN.—Dr. C. H. Lindsley in his monthly report for May records 101 deaths, equivalent to an annual death-rate of 16.1 per 1,000. The mortality is greater than the average of the corresponding month for the past 5 years, but less than for the same month last year. Scarlet fever caused 12 deaths, diphtheria 2, typhoid fever 1, diarrhoea 2, consumption 16, pneumonia 8, bronchitis 3, and violence 5.

DETROIT, MICH.—Dr. O. W. Wight in his report for May records 262 deaths, which is equivalent to an annual death-rate of 22.03 per 1,000. Of the decedents 131, or 50 per cent., were under 5 years of age. Diphtheria caused 22 deaths, croup 9, measles 11, scarlet fever 4, typhoid fever 1, malarial fevers 2, diarrhoeal diseases 5, consumption 19, acute lung diseases 30, and violence 6.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales during the week ending May 24, was 10.9 per 1,000. The highest annual death-rates from measles were 6.4 in Oldham, and 4.1 in Plymouth; and from scarlet fever, 1.7 in Newcastle-on-Tyne. Small-pox caused 17 deaths in London, 4 in the Hospital Ship "Atlas" outside of London, 3 in Sheffield, 2 in Liverpool, 1 in Derby, and 1 in Sunderland.

LONDON.—Births, 2,627; deaths, 1,427, the latter being equivalent to an annual death-rate of 18.5 per 1,000, a decrease of 1.4 from the rate of the previous week. The fatal cases of small-pox were 17 in number and in addition 5 more were recorded in the Hospital Ship "Atlas," at Darent, outside Registration London. The number of cases under treatment in the hospitals has increased to 976, there being 248 new cases admitted during the week. Measles caused 81 deaths, scarlet fever 25, diphtheria 19, whooping-cough 92, typhoid

fever 11, and 19 from diarrhoeal diseases. To diseases of the respiratory organs were referred 261 deaths, and to consumption 136. Different forms of violence caused 63 deaths.

ENGLAND.—The annual summary of the Registrar-General for the year 1883, in the 28 large towns, gives the annual death-rate per 1,000 as 21.57. The lowest rate recorded was 17.90 in Bristol; the highest 27.64, in Manchester. In London the rate was 20.44.

In London, the year 1883 was remarkable for the low-ness of its marriage, birth, and death-rates, the marriage and death-rate being lower than any before recorded, and the birth-rate was lower than any recorded in the past 22 years. The birth-rate was 33.9 per 1,000, and the death-rate 20.4 per 1,000, being the lowest on record in London. A small share of the diminished death-rate in London must be attributed to the fact that the birth-rate was exceedingly low. Also the mortality of these fewer number of infants was exceptionally low. The main cause, however, of the low death-rate was the comparatively equable temperature prevailing throughout the year, there having been neither excessive cold in the winter months nor great heat in the summer, so that the mortality from

Glasgow.—Deaths, 256; annual death-rate, 25.7. Measles caused 2 deaths, scarlet fever 5, diphtheria 4, whooping-cough 18, diarrhoea 4, acute lung diseases 51, and violence 16.

Edinburgh.—Deaths, 89; annual death-rate, 18.8 per 1,000. Measles and diphtheria each caused 2 deaths, whooping-cough 4, diarrhoea 1, acute lung diseases 14, and violence 2.

IRELAND.—The average annual death-rate in the 16 principal town districts for the week ending May 24 was 22.8 per 1,000.

Dublin.—Deaths, 155; annual death-rate, 23.0 per 1,000. Measles and whooping-cough each caused 1 death, scarlet fever 3, diphtheria 2, typhoid fever 1, consumption 25, acute lung diseases 27, and violence 5.

Belfast.—Deaths, 96; annual death-rate 23.0 per 1,000. Scarlet fever caused 2 deaths, whooping-cough 5, diarrhoea 1, acute lung diseases 26, consumption 20, and violence 2.

FRANCE—Paris.—During the week ending May 22 there were 1,097 deaths, equivalent to an annual death-rate of 25.4 per 1,000, against 28.0 for the preceding week. There was but little change in the mortality from the different zymotic diseases, except typhoid fever, which caused 49 deaths, against 39 for the previous week. Small-pox caused 1 death, scarlet fever 4, whooping-cough 13, measles 43, diphtheria 48, diarrhoeal diseases 53, consumption 139, bronchitis 32, pneumonia 74, and violence 30.

BELGIUM—Brussels.—Week ending May 17: Deaths, 191; annual death-rate, 23.5 per 1,000. Small-pox caused 16 deaths, typhoid fever 9, croup 5, whooping-cough 1, diarrhoeal diseases 15, bronchitis and pneumonia 32, consumption 18, and violence 8.

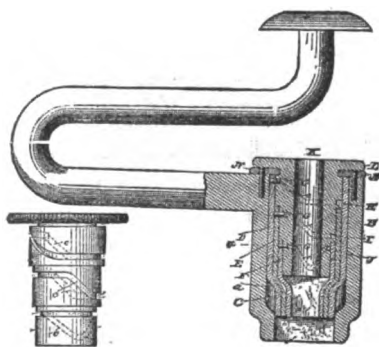
RUSSIA—St. Petersburg.—Week ending May 10: Deaths, 685; annual death-rate 38.4 per 1,000. Small-pox caused 3 deaths, measles 52, scarlet fever 17, typhoid fever 24, diphtheria 21, whooping-cough 9, diarrhoeal diseases 103, and bronchitis and pneumonia 83.

DENMARK—Copenhagen.—Week ending May 20: Deaths, 131; annual death-rate, 25.5 per 1,000. Diphtheria caused 4 deaths, whooping-cough 3, diarrhoeal diseases 6, consumption 14, acute lung diseases 15, and violence 5.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

294,418. WRENCH. JUDSON A. STANTON, Sauk Rapids, Minn. Filed January 9, 1884. (No model.) Issued March 4, 1884.



Claim.—1. In a wrench, the combination, with a hub and means for operating the same, of a series of vertically-sliding sleeves moving therein and increasing in size, a spindle or chuck disposed within the hub, and devices whereby as the spindle is operated the sleeves are caused to descend successively into position, as set forth.

2. In a wrench, the combination, with a hub having a series of vertically-sliding sleeves moving therein and increasing in size, of a spindle or chuck disposed within the hub, pins projecting from the sleeves and entering grooves in the spindle or chuck, and means for operating the hub, as set forth.

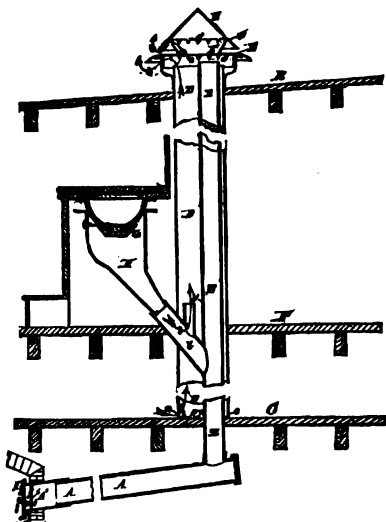
3. In a wrench, the combination, with a hub and means for operating the same, of a series of vertically-sliding sleeves increasing in size and moving therein, a spindle or chuck disposed within the hub, means for guiding and limiting the descent of the sleeves, a projecting rim or flange at the upper end of the spindle, and a washer-plate interposed between the rim and the top of the hub, as set forth.

4. In a wrench, the combination, with a hub having a series of vertically-sliding sleeves increasing in size and moving therein, of a spindle or chuck disposed within the hub and formed with bands increasing in size in proportion to the sleeves, grooves formed in the bands to receive pins projecting from the sleeves, said grooves having an angular or inclined portion, and means for operating the hub, as set forth.

294,808. WASTE-PIPE VENTILATOR. JOHANNES PERSSON, New York, N. Y. Filed June 28, 1883. (No model.) Issued March 4, 1884.

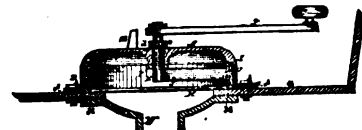
Claim.—1. The combination of the hopper H, the waste-pipe connection B, provided with the upward-projecting open pipe B', the waste-pipe B, and the air-

pipe D, inclosing the said pipes B and B', the said pipe D being open at its upper end, and having also openings C at its lower end, substantially as and for the purpose set forth.



2. In combination with the waste-pipe B and drain-pipe A, the flanged joint A', provided with the end valve, I, and the valve J, pivoted inside of the said joint A', the said valve J being provided with means I, operating against the valve I to open the latter simultaneously with the former, substantially as and for the purpose set forth.

294,511. SEWER-GAS CHECK. CHARLES ANDREW SCHEFFLER, Chicago, Ill., assignor to himself and Samuel H. Adams, same place. Filed April 17, 1883. (No model.) Issued March 4, 1884.



Claim.—In sewer-gas checks, the case A, provided with the semi-circular flange A, an opening D, and an annular seat, I, in combination with the sliding gate B C, post E, and lever F, the gate having an upper bearing on the guide I, a bearing on the vertical part of the case, and a lower bearing on the sink-bottom, as specified.

294,448. BOILER. ALFRED E. DALLEY, Quincy, Mich. Filed June 30, 1883. (No model.) Issued March 4, 1884.

294,889. FLUID-ACTUATED VALVE. WILLIAM BOORMAN, Philadelphia, Pa., assignor, by direct and mesne assignments, to Charles Bernhard Behrens and Thomas Sherman, both of same place, and Sigmund Behrens, New York, N. Y. Filed October 17, 1883. (No model.) Issued March 4, 1884.

294,860. FIRE-ESCAPE. NICHOLAS H. BORG-FELDT, New York, N. Y. Filed April 28, 1883. (No model.) Issued March 4, 1884.

294,409. BURNER. IRA W. SHALER, Brooklyn, N. Y. Filed July 2, 1883. (No model.) Issued March 4, 1884.

294,697. COMBINED GAS AND ELECTRIC-LIGHT FIXTURE. LUTHER STIERINGER, New York, N. Y. Filed June 14, 1882. (No model.) Issued March 4, 1884.

294,518. GAUGE FOR PIPE-THREADING MACHINE. GEORGE F. SMITH, Bridgeport, Conn. Filed February 21, 1883. (No model.) Issued March 4, 1884.

294,822 and 294,823. FIRE-ESCAPE. JEREMIAH STEVER, Bridgeport, Conn., assignor, by direct and mesne assignments, to the Bridgeport Automatic Safety Ladder and Hardware Company, same place. Filed February 24, 1883. (No model.) Issued March 4, 1884.

284,827. CARBURETING-MACHINE. OAKES TIRKILL, New York, N. Y., and JAMES P. WILSON, Newark, N. J. Filed January 16, 1883. (No model.) Issued March 4, 1884.

294,829. AUTOMATIC DEVICE FOR STOPPING STEAM-PUMPS. THOMAS C. TOWNSEND, New York, N. Y. Filed October 4, 1883. (No model.) Issued March 4, 1884.

294,834. APPARATUS FOR MANUFACTURING GAS. BURIANS VAN STEENBERGH, Goshen, N. Y. Filed October 23, 1883. (No model.) Issued March 4, 1884.

294,567. DITCHING-MACHINE. WILLIAM T. BENNETT, Newport, Ind. Filed July 21, 1883. (No model.) Issued March 4, 1884.

294,892. MANUFACTURE OF CREAM OF TARTAR. FRANZ DIETRICH, Munich, Germany. Filed October 23, 1883. (No specimens.) Issued March 4, 1884.

Claim.—1. The process herein described of manufacturing cream of tartar from argols, consisting in treating the dissolved argols with phosphoric acid or its compounds, and then clarifying and decolorizing it, as set forth.

2. The method herein described of manufacturing cream of tartar from argols, consisting in treating the dissolved argols with phosphoric acid or its compounds, boiling the mixture, clarifying it with clay, and finally decolorizing it with animal charcoal which has been previously treated with muriatic acid, as set forth.

294,802. HYDROCARBON-GAS GENERATOR. JOSEPH FLANNERY, Philadelphia, Pa. Filed March 20, 1883. (No model.) Issued March 4, 1884.

English Patents.

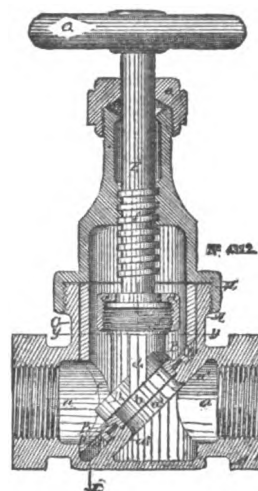
8,378. A NEW OR IMPROVED METHOD OF JOINTING LEAD OR SOFT-METAL PIPES AND THEIR CONNECTIONS AND APPARATUS FOR THAT PURPOSE. [Communicated from abroad by Frederick Coney, of Antwerp, in the Kingdom of Belgium.]



This invention relates to the jointing of lead or other soft-metal pipes to one another and to connections, such as nozzles or stop-cocks. For jointing together two lengths of pipe, an externally screwed ring is placed on the one length and an internally screwed socket with an internal washer is placed on the other length, in each case a little distance from the end.

THOMAS PERCEVAL WILSON, of No. 3 Whitehall Place, Westminster, in the county of Middlesex. Prov. Spec. July 7, 1883. Letters patented December 14, 1883. (Price 4d.)

4,822. IMPROVEMENTS IN STRAIGHT-WAY STOP-VALVES, and in what manner the same is to be performed.



Communicated from abroad to HERBERT JOHN ALLISON, of 52 Chancery Lane, London, Middlesex, Patent Agent. Complete Spec. March 4, 1884. (Price 6d.)

Association News.

PHILADELPHIA MASTER PLUMBERS.—The regular monthly meeting of the association was held on Thursday evening, June 12, the President, Mr. Henry J. Burke in the chair, and was one of more than ordinary interest and profit. The members of the association appeared to be taking a lively interest in the welfare of their organization, and by their attendance and work are showing their appreciation of the benefits to be derived therefrom. The first business, of course, was the reading of the minutes of the previous meeting and their adoption. The case of Mr. Mead in his relation to the National Executive Committee then came in for some consideration, and also the circular sent around to the associations in reference to appointment of delegates to the National Convention. The committee which had been appointed to prepare the essay assigned to the Philadelphia association reported as having prepared the paper and presented it for the approval of the association, and asking to be discharged from further consideration. The essay was read by the chairman of the committee, Mr. John J. Weaver, and it was approved and referred to the Committee on Essays of the National Convention. The topic on which the paper treats is "The National Association." The regular election for the officers of the association was then commenced. The officers to be chosen were president, vice-president, secretary, corresponding secretary, treasurer, and sergeant-at-arms. On the third ballot Mr. John J. Weaver was declared elected, the retiring President, Mr. Burke, having declined re-election. The Vice-Presidents chosen were A. G. Bond, William M. Wright, A. M. Hicks, William Harkness, and W. W. Mentzinger. Mr. Enoch Remick was re-elected secretary without opposition, and George T. Gabell was chosen Corresponding Secretary; John I. Anson was elected Treasurer; and George Uber, Sergeant-at-arms. After the election the members had a general talk about the approaching meeting of the National Association, and the hope was expressed that the next meeting would be held in this city.

ROCHESTER, N. Y., MASTER PLUMBERS.—The Association has decided not to send delegates to the Baltimore convention.

MECHANICAL AND PRACTICAL ENGINEERS.—A society to be known as the "Mechanical and Practical Engineers' Club of the City of New York" has lately been organized which has for its object the promotion and diffusion of practical knowledge on all branches of domestic engineering, but particularly those which are the outgrowth of the great buildings lately being constructed in this city. Its members are engineers of buildings in New York and vicinity, and their meetings, for the present, are held in the parlors of the Sinclair House, Eighth Street and Broadway. The following persons have been elected to office: James Morrow, President; James Barnes, Vice-President; J. H. Fisher, Secretary; E. J. Wood, Treasurer.

DETROIT, MICH.—The delegates to the Convention of the National Association of Master Plumbers, which meets at Baltimore on the 25th inst., from Detroit, are T. P. Tuite, J. D. Mouat, S. W. Wayson, William Blackwood, and William C. Wilson.

PITTSBURG, PA., MASTER PLUMBERS.—The Master Plumbers' Association at its last meeting elected the following delegates to the National Convention, which meets in Baltimore next month: J. P. Reineke, I. K. Becker, S. H. Hare, J. G. Welden, and James Anderson.

THE CONNECTICUT ENGINEERS' AND SURVEYORS' ASSOCIATION held a meeting in the Common Council Chamber in the city of Hartford, June 18.

THE AMERICAN PUBLIC HEALTH ASSOCIATION requests, through the Secretary, Dr. Speigenthaler, of St. Louis, that members who intend to read papers at the St. Louis meeting, October 14-17, will inform him of the fact as soon as possible.

THE JOURNEMEN PLUMBERS' AND GAS-FITTERS' PROTECTIVE AND BENEVOLENT ASSOCIATION OF BROOKLYN held its annual picnic and promenade at Bay View Park last Monday evening. The weather was fine, the management good, and all conducted to a successful entertainment. McCormick's 14th Regiment Band furnished the music.

Notes.

CONSTRUCTION.

KALAMAZOO, MICH.—The Water-Works has asked the following named bidders to furnish plans for a new horizontal condensing pumping-engine, with a capacity of 3,000,000 gallons in 24 hours against a water pressure of from 50 to 110 pounds, to produce a duty of 95,000,000 foot-pounds of work for every 100 pounds of coal consumed with present boiler setting, the piston speed not to exceed 125 feet per minute, with cost of same: Deane Co., a 3,000,000-gallon pumping-engine, \$12,000; Holly Manufacturing Co., a 3,000,000-gallon engine, \$16,000; Gaskill type: a 4,000,000-gallon engine, \$18,000; Worthington Co., a 3,000,000-gallon engine, \$13,250; and E. P. Ellis & Co. of Milwaukee, Wis., a 3,000,000-gallon engine, three kinds, \$18,200, \$17,700, and \$16,700. Plans have been made for a brick building for the engine, to cost probably \$6,000.

INDIANAPOLIS, IND.—The new State Insane Asylum Commissioners met June 3 and opened the bids for the erection of the new Insane Hospital at Logansport. Three bids were received, as follows: McCormack & Hege, Columbus, Ind., \$362,802.29; Charles Pierce & Co., Indianapolis, \$383,354.72; M. A. Sweeney & Bros., Jeffersonville, \$392,889.54. McCormack & Hege, the lowest bidders, were some weeks ago awarded the contract to build the Evansville Hospital.

DETROIT, MICH.—The plumbing, gas, and steam-fitting of Assumption College, Sandwich, Ont., has just been completed by John Hannon, of Detroit, for which he receives \$9,000. He has recently received the contract at \$2,500 for doing the steam-heating for the cathedral connected with the college.

DETROIT, MICH.—J. D. Mouat received the contract at \$8,000 for the plumbing and gas-fitting in the new Harper Hospital, and \$5,000 for the Campan Building.

CLEVELAND, O.—Messrs. Brennan & Riley are making rapid progress on the Broadway main sewer, which will be nearly three miles in length. The same street will be paved as soon as the sewer is completed, bids having already been advertised for.

PIQUA, O.—The design of Messrs. Crapsey & Brown, architects of Cincinnati, has been adopted by the city of Piqua for their new town hall. The building will cost when completed upward of \$75,000. It is to be constructed of pressed-brick, with freestone trimmings. It will contain a clock-tower 150 feet high, commodious rooms for all the city offices, a hall for public purposes 40x70 feet, with a smaller hall which will be used by the Oddfellows, and apartments for the post-office.

ST. PAUL, MINN.—J. J. Dunnigan has received the contract for the plumbing and gas-fitting of the German-American Bank.

CLEVELAND, O.—Plans have been prepared for a new pumping-house at the Fairmount Street reservoir. The building will be of stone, in the Gothic style. The engine-room will be of 48'x56', three stories high, and the boiler-room 52'x63', one story. The stand-pipe, by means of which a head sufficient to force the water to the high-service reservoir is to be obtained, will be in a tower 200 feet high and 25 feet square at the base. Two Cornish engines will be used. The cost of the building has not yet been estimated.

COHOES, N. Y.—Governor Cleveland having signed the bill empowering the Cohoes Company to construct a dam on the Mohawk River, Engineer D. H. Van Auken is preparing plans for the work.

NEW YORK CITY.—Plans and specifications for a third contract street-cleaning district have been sent to each member of the Board of Estimate and Apportionment. The district proposed embraces all that part of the city between Fourteenth and Fifty-ninth Streets and the North and East Rivers, and also Broadway from Central Park to Bowling Green. There are now only two districts in the city in which the street-cleaning is done by contract. The first district includes that part of the city south of Fourteenth Street and east of Broadway, and the second that part south of Fourteenth Street and west of Broadway. The rest of the city is cleaned by the Department. The contract for cleaning the first district is let to Hayward & Duffy, and that for cleaning the second district to John S. Brown. When the contracts were let, Tammany, through Alderman Kirk, its representative in the Board of Estimate and Apportionment, fought the plan tooth and nail, and during the winter Cullen, the Tammany Senator, endeavored by every possible means to get a bill through the Legislature nullifying the contract. The bill failed, and it is fair to assume that the proposed new contract district will meet with most determined opposition.—*N. Y. Times.*

ST. PAUL, MINN.—The Board of Public Works has favorably reported to the Council on the building of a sewer in Goodrich, Oakland, Dale, Portland, Ashland, Laurel, and Summit Avenues, at a cost of \$43,850.

FORT WAYNE, IND.—The Masonic Temple Association invite proposals until June 21, with accompanying plans or designs, of heating and ventilating the Opera House portion of the building by steam. Boiler and setting already contracted for. For particulars apply to the architects, J. F. Wing & Co., Fort Wayne, Ind.

WISHAW, ENG.—The contractor, Mr. J. M. Pearson, Kilmarnock, has broken ground for the introduction of a water-supply. The work is expected to be finished in three or four months. The new supply is to be got from the Allanton and Dura springs, the necessary ground, with some two miles of way-leave, having been acquired. The flow is calculated at 159,490 gallons per day in winter, and 60,000 gallons in summer, giving 20 gallons per head to the population. The total cost is estimated at \$12,000.

RUSSIAN WATER-WORKS.—Nicholas Simin, Chief Engineer of the Moscow (Russia) Water-Works, has addressed a letter to "the municipality of the city of Detroit," stating the city of Moscow proposes to build new water-works, and he thinks the modern constructions of this kind in the United States the most instructive and conformable to his conditions. He sends a list of printed questions asking the capacity per day of the Detroit works, kind and length of pipes, description of the engines, the influence of water-works on fire protection, and other questions of the same kind.

GENEVA, N. Y.—W. B. Dunning, of Geneva, N. Y., has the contract for furnishing two of their largest heating boilers for the new opera-house in Hastings, Neb.

IONIA, MICH.—The water-works completed a few months ago uses water from springs in the vicinity. The pumping capacity is 2,000,000 gallons. C. Van Vleck is the chief engineer.

ALLEGHENY, PA.—The Council has awarded the following contracts for the Water Department: To Samuel Hastings, stop-gate boxes, \$4.75 each; wooden fire-plug boxes, \$4 each; and wooden wash-out boxes, at \$1.50 each. To Dennis, Long & Co., water-pipe, all sizes, at \$38 per ton; branches and sleeves, at 3½ cents per pound. To Bailey, Farrell & Co., ten tons pig-lead, at 3½ cents per pound. To Reese, Shook & Co., ferrules, ½-inch, \$5.85 per dozen; ¾-inch, \$6.20; 1-inch, \$7.85; and 1½-inch, \$9. To Maxwell, Silliman & Evans, miscellaneous castings, at 1¼ cents per pound. To Hutchinson & Alexander, fire-plugs, at \$27 each; stop-gates, 4-inch, \$11; 6-inch, \$15; 8-inch, \$23; 10-inch, \$34; 12-inch, \$48; 15-inch, \$80; 20-inch, \$126; 24-inch, \$270; 30-inch, \$415; and 36-inch, \$620.

THE Pond Engineering Company, St. Louis, has been awarded the contract to furnish two pumping-engines for the Victoria, Texas, Water-Works. The engines will have a capacity of 1,500,000 gallons per day, and will be of the Blake improved compound duplex pattern.—*Engineering News.*

BROOKLYN, N. Y.—The following are bids for mason and carpenter-work on three schools opened June 3 by the Board of Education:

MASON-WORK ALONE.	BERKLEY PLACE SCHOOL-HOUSE.	DEGRAU ST. SCHOOL-HOUSE.	BOERUM ST. SCHOOL-HOUSE.
P. J. Collins.....	\$11,000	\$28,742	....
James Ashfield & Sons.....	33,297	....	\$35,000
S. J. Kelly.....	32,160	24,079	....
Thomas Gibbons.....	....	....	33,990
John Thatcher.....	....	20,570	....
F. Carlin & Sons.....	30,700	27,875	....
J. H. O'Rourke.....	27,876	22,795	....
John McQuaid.....	....	....	33,745
James H. Stevenson & Son.....	31,660	25,464	....
Matthew Smith.....	....	....	33,775
James Roney.....	31,263	....	34,556.40
James Ricard.....	29,400	23,230	....

MASON AND CARPENTER-WORK.	BERKLEY PLACE SCHOOL-HOUSE.	DEGRAU ST. SCHOOL-HOUSE.	BOERUM ST. SCHOOL-HOUSE.
James Ashfield & Sons.....	\$59,807	\$45,995	....
James H. Stevenson & Son.....	52,980	41,449	....
P. F. O'Brien.....	....	....	\$62,236

CARPENTER-WORK ALONE.	BERKLEY PLACE SCHOOL-HOUSE.	DEGRAU ST. SCHOOL-HOUSE.	BOERUM ST. SCHOOL-HOUSE.
C. Dinnington.....	\$20,719	....	....
P. F. O'Brien.....	26,781	\$18,495	\$28,334
Martin & Lee.....	20,900	17,175	....
Francis D. Norris.....	21,240	14,345	24,750
Francis G. Turner.....	23,992	16,574	26,584
Morrison & Selover.....	21,319	15,983	25,000
L. W. Seaman, Jr.....	21,500	....	....
John S. McRea.....	19,000	13,700	....
Myron C. Rush.....	21,452	15,456	23,884
R. B. Ferguson.....	....	....	21,993

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
June 14.....	24.27	17.77	23.26	29.67	26.97	18.23

E. G. LOVE, Ph.D., Gas Examiner.

THE Consumers' Gas Company is a new applicant for franchises in Boston, Mass.

OAKLAND and Stockton, Cal., will be lighted by electricity at an early day. Fifty electric-lights have been ordered for Goshen, Ind., and 100 for Danville, Ill.

CLEVELAND, O.—The Council has authorized their Committee on Lighting to advertise for bids for lighting the city for one year from

next January. The lighting is by electricity, gas, and vapor, and a fund of \$106,000 is provided annually to meet the expense.

THE Superintendent of the Philadelphia Police and Fire-Alarm Telegraph has seized the wires of the Postal Telegraph Company which are strung on the city's poles, on account of failure of the latter company to put them underground by May 1, according to their agreement.

SINCE the Westinghouse natural-gas well, near Pittsburg, was struck about two weeks ago, eleven wells have been sunk in the vicinity. Mr. Westinghouse has made a proposition to supply the city buildings with gas free of cost, on condition that he be permitted to lay pipes through the streets, which is now pending in the Councils.

AN associated press dispatch states that on June 13 several boys in Bridgeport, Conn., found a telephone wire hanging loose from a pole. One of the number threw it over the Electric Lighting company's city circuit, and dared a lad of ten years to take hold of it. He did so with his right hand, and the current by this means was grounded through his body. In order to pull his hand away he took hold with the left hand, and was instantly killed.

THE proposition to light Detroit, Mich., by means of seventy-two towers by the Brush Electric-Light Company for the sum of \$95,000 for one year was vetoed by the Mayor. The matter came up in the Board of Aldermen last Tuesday evening, and that body voted to override the veto by a vote of twenty-four to one. There seems to be some doubt about getting the necessary number of votes to carry the Board of Councilmen despite the objections of the Mayor. The local gas-light companies are talking of a coming reduction in the price of gas.

AT a recent meeting of the Chemical Society, Dr. Percy Frankland read a paper "On the Composition of Coal and Cannel-Gas in Relation to their Illuminating Power." In this paper the author gives the results of his examination, somewhat in detail, of the gas supplied to some of the more important towns in the United Kingdom. The constituents which have been individually determined are the hydrocarbons absorbed by fuming sulphuric-acid, carbonic-anhydride, oxygen, nitrogen, hydrogen, carbonic oxide, and marsh-gas. In all cases the carbon density of the hydrocarbons has been determined, and in many cases also the hydrogen density, the carbon and hydrogen densities together representing the average molecular formula of the hydrocarbons present. Details of the determination of these densities are given. The reputed illuminating power and the ratio of the illuminating power to the proportion of ethylene to which the heavy hydrocarbons are equivalent are also recorded. The predominant hydrocarbon seems to be ethylene, but the quantity of this gas present is quite insufficient to account for the illuminating power of the gas, so that the denser hydrocarbons though present in comparatively insignificant proportions, have much to do with the actual illuminating power. In comparing these analyses with similar results obtained in 1851 and 1876, it is seen that the carbon density has diminished, while the quantity of nitrogen has increased.—*Engineer.*

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; h s, dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK.

536 E. 13th st, 5-story br ten; cost, \$12,000; o, Albert Stuhmann; b, E. Sorenson.
71-73 Wall st, part 7 and part 8-story br and stone office bldg; cost, \$200,000; o, Eagle Fire Co., A. J. Clinton, pres't; a, G. E. Harney; b, Marc Eidlitz and O. T. Mackey.
66 Grand st, 5-story br st; cost, \$28,000; o, Helena L. G. Asinari; a, Wm. H. Hume.
Washington st, n w cor Christopher st, 5-story br ten; cost, \$12,000; trustee, W. H. Beadleston; a, M. C. Merritt.
496-498 Broome st, 2 5-story br sts, cost, ea, \$15,000; o, J. Pace and Jacob Beyer; a, E. W. Greis.
79-81 Spring st, and 74-76 Crosby st, 6-story br store; cost, \$85,000; o and b, O. G. Walbridge, Brooklyn; a, R. Berger.
264 Broome st, 6-story br factory; cost, days' work; o, Mary O'Neil, Yonkers, N. Y.; a, Jos. M. Dunn.
Bowery, s w cor Houston st, 3 4-story br and b s sts; cost, ea, \$20,000; o, Wm. Astor; a, H. C. De Baud; b, J. Webb & Son and John Downey.

Elizabeth st, e s, 20.6 s Houston st, 5 5-story br tens; cost, ea, \$11,000; o, Wm. Astor; a, H. C. De Baud; b, Jas. Webb & Son and John Downey.

South st, n s, and Front st, s s, 200 w Jackson sq, front on Front st, 6-story br st and ten; cost, \$16,000; o, Isabella V. Hogan, by J. Hogan, agent; a, Andrew Spence.
50th st, n s, 257 e Madison av, 2 5-story br flats; cost, ea, \$40,000; o, Bernard Spaulding; a, George Ed. Harding.

321-323 W. 17th st, 2 5-story br flats; cost, ea, \$28,000; o, Geo. Shepherd; a, Jos. M. Dunn.

210 5th av, and 1130 Broadway, one part four and one part eight-story br and iron flat; cost, \$8,000; o, Mrs. G. R. Hoffman; a, John B. Snook; b, not contracted for.

551-553 W. 50th st, 3 5-story b s front tens; cost, ea, \$14,000; o, Martha A. Lawson; a and carp, Judson Lawson; masons, Gillispie & Harlow.

11th av, e s, bet 40th and 41st sts, 5-story br ten; cost, \$35,000; o, Alfred Lister, Newark, N. J.; a, Staehlin & Steiger; b, Robt. R. Converse and E. R. Villet.

9th av, s w cor 48th st, 2 5-story br tens and sts; cost, ea, \$12,000; o, Simon Kay; a, M. C. Merritt.

334-336 W. 48th st, 5-story b s front flat; cost, \$45,000; o, John Strobel; a, Augustus Hatfield.

537-545 E. 15th st, rear, 4-story br factory; cost, \$12,000; o, James Mulry; a, Fred Jenth.

81st st, n s, 231.6 e 1st av, 4 5-story br ten; cost, \$65,000; o and b, Matthias H. Schneider; a, J. Kastner.

102d st, s s, 135 e 3d av, 1 5-story b s front ten; cost, \$12,000; o, James Roache; a, A. B. Ogden & Son.

1450 1st av, 1 5-story b s front ten and st; cost, \$16,000; o, Rosanna McInty; a and b, Michael McInty.

2d av n w cor 70th st, 4 5-story Connecticut b s st and ten; cost, ea, \$15,000; o, Elizabeth Seitz; a, John Brandt.

312-314 W 60th st, 2 5-story br flats; cost by day's work; o, Denis S. Dwyer; a, Joseph M. Dunn.

316-318 W 60th st, 2 5-story br flats; cost day's work; o, Ellen Purcell; a, Joseph M. Dunn.

82d st, s s, 133.11 w 9th av, 5 4-story b s dwells; cost, ea, \$15,000; o, Samuel Colcord; a, H. L. Harris.

82d st, s s, 325 to 400 e 9th av, 4 4-story br and b s dwell; cost, ea, \$13,000; o, George S. Miller; a, R. S. Townsend.

7th av s e cor 126th st, 4-story b s front ten; cost, \$25,000; o, Charles Batcheler; a, M. V. B. Ferdon.

ALTERATIONS, NEW YORK.

513 W 22d st, 2-story and bmt br extn and int altns; cost, \$9,000; o, Kinney Tobacco Co.; a, M. C. Merritt.
3 Beaver st, raise height and int altns; cost, \$12,000; o, Schermerhorn estate; a and b, Joseph Richardson.

31 W 42d st, int altns, new heating and ventilating apparatus put in, etc.; cost, \$50,000; o, West Presbyterian Church, Heber R. Bishop and others, trustees; a, J. C. Cady & Co; b, Marc Eidlitz & Son and E. Snedeker.

Madison av s e cor 63d st, 4-story br extn; cost, \$8,000; o, Rhoda F. Mack; a, Renwick, Aspinwall & Russell; b, E. D. Connolly & Son and Edward Gridley.

31-33 Thomas st, repair damage by fire; cost, \$6,000; o, New York Real Estate Ass'n, G. P. Slade, Sec'y; a, R. Berger; b, W. G. Slade and H. D. Powers.

Henry st n e cor Rutgers st, br extn, int altns; cost, \$6,500; o, Edwin M. Brown, exr. G. Brown; a, J. Kastner; b, R. Hudson.

BROOKLYN.

Greene av, n s, 40 e Waverly av, 3 3-story and bmt b s dwell; cost, ea, \$7,000; o, George Harvey; a and b, H. E. Fickett.

Quincy st, s s, 216 e Reid av, 3 2-story and bmt b s dwell; cost, ea, \$4,000; o, A. S. Walch; a, A. Miller.

Greene st n w cor West, 2 bldgs, 1 6-story and 1 1-story, for manufactory and engine-room; cost, \$50,000; o, New York Dye Wood Extracts and Chemical Co.; a, J. Ireland; b, Burton & Nickel and Hamilton & Henry.

ALTERATIONS, BROOKLYN.

91 Willow st, 1-story and bmt br extn; cost, \$5,000; o, Thomas S. Moore; a, W. B. Tubby; b, F. D. Norris.
217 Columbia st, 2 br extns; cost, \$5,500; o, Marie S. Strenger; a, E. Kenny.

BLOOMINGTON, ILL.—Fr dwell; cost, \$10,000; o, Mr. McIntosh; a, Huber & Spohr.

BOSTON, MASS.—King st, nr Dorchester av, 4 dwells; o, F. M. & A. G. Frost; b, C. L. Weldon.

Hyde Park av, 2 dwells; o, Mrs. A. N. Patterson; b, Wm. U. Patterson.

1 Bunker Hill, dwell and st; o, J. Richardson; b, J. B. Wilson.

67-69 Munroe st, 2 dwells; o, J. C. & E. Lowd; b, C. E. Currier.

786-788 E. 4th st, 2 dwells; o, H. Hussey; b, W. F. Eaton.

19-21 Warren st, mercantile bldg; o, F. A. Brooks; b, W. H. Hoyford.

51-53 Moulton st, 2 dwells; o, J. Meade; b, D. Brock.

19 Fontaine st, 3 dwells; o, J. G. Haynes; b, G. W. Pope.

128-130-132-134-136 Bowen st, 5 dwells; o, J. V. Devine; b, G. W. Pope.

509-561-603-605 E. 3d st, 4 dwells; o, O. D. Dana; b, H. Manson.

649 E. 4th st, 2 dwells; o, H. Clapp; b, T. Clure.

98-100-102 Everett st, 3 dwells; o, G. W. Hargrave; b, R. L. Garlick.

71-73 Center st, 2 dwells; o, A. Geiger; b, A. D. Gould.

15 Tabor st, 2 dwells; o, P. O'Donnell.

21 Charles st, br ten; o, J. C. & E. A. Lord.

934-36-38-40-42 E. Broadway, 5 fr dwells; o, J. Collins; b, D. Sullivan & Son.

70 Old Harbor fr dwell; o, H. B. Stratton; b, D. Sullivan & Son.

286 Newbury st, fr dwell; o, S. W. Merrill; b, D. Sullivan & Son.

CHICAGO, ILL.—101-121 Iowa st, br cottages; cost, \$10,000; o, W. D. Kerfoot & Co.

102-22 Iowa st, br cottages; cost, \$10,000; o, W. D. Kerfoot & Co.

505 N Clark st, br dwell; cost, \$11,500; o, P. H. Steinmiller; a, J. H. Huber; b, L. Weick.

644-46 Blue Island av, br st and dwell; cost, \$13,000; o, a and b, John Kalomec.

Cottage Grove av and 31st st, br st and dwell; cost, \$50,000; o, Conrad Seipp; a, Bauer & Hill; b, George Schneider.

C. C. Howson, R. F. Boos, J. M. Van Osdel, L. B. Dixon, N. S. Patton, Chanley, T. V. Wadskier, W. L. B. Jenney, and Pentecost & Lumloch have plans for buildings valued at from \$5,000 to \$9,000.

CHARLESTON, S. C.—Cor East Bay and Pinckney st, Union cotton press; o, Union Cotton Press Company.

Church and Cumberland st, Champion cotton press; o, Champion Cotton Press Company.

Church and St. Nicholas sts, Charleston Hydraulic Cotton Press; o, Charleston Cotton Press Company.

The above work for the cotton presses is not contracted for, but is being done by the company. The

THE SANITARY ENGINEER.

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KITCHEN CESSPOOLS ARE DANGEROUS NUISANCES.

A CESSPOOL is in old English a "soospool"—that is, a "soakpool"—a place into which liquid slops and offscourings may be run, and from which, as usually constructed, it is hoped that the liquid portion will soak or drain away, thus sparing the proprietor the trouble of emptying it. The term is most generally applied, at present, to receptacles or cisterns constructed underground in the vicinity of the house, to receive the kitchen-slops and sink-wastes, as distinguished from privy-vaults or receptacles intended only, or chiefly, for the reception of excreta, but it is also used by some writers as including the latter, and, as a matter of fact, a large number of cesspools receive both kinds of waste. The cesspools to which we specially refer at present are those into which excreta are not allowed to enter, but which are devoted chiefly, if not exclusively, to the reception of kitchen-waste. From time to time inquiries are received by THE SANITARY ENGINEER which indicate that the writers suppose that the only dangers in house-drainage are connected with the disposal of excreta, with privy-vaults or water-closet wastes; and that if these are properly arranged the sink-slops need little attention. This is a mistaken opinion, and it is time that people learned to recognize it as such. No doubt it is true that water-closet waste is more dangerous to health than kitchen-slops; it is more likely to contain specific contagia, and is more offensive, but considered merely as furnishing material in which may be developed dangerous organisms, as decaying organic matter or filth, there is not so much difference between these two forms of waste products after all, nor is a cesspool less offensive than a privy-vault. Neither of them are satisfactory appendages to a house, but where their employment becomes a necessity the same precautions as to location, construction, etc., should be applied to one as to the other. The essential points are to prevent leakage by making them water-tight, to provide a free outlet for the gases which will be generated in them, and to locate this outlet at such a height that there shall be no danger that the gases escaping from it shall blow into the house. Such cesspools should be small, and emptied regularly and frequently.

The most unwise disposition which can be made of a cesspool is to connect the upper part of it with a sewer. When a street is sewered the cesspools on that street should be cleaned out and filled up with fresh, clean earth and the house-drainage be connected directly with the sewer. To retain the cesspool under such circumstances is to insure that all the house-waste shall be in a putrefying condition before it enters the sewer, and hence make it impossible to keep the air in the sewer inoffensive.

COMPETITIVE EXAMINATIONS FOR ENGINEERS OF OFFICE BUILDINGS.

It is with pleasure we hear that the chief engineer for the Manhattan Company's and Merchants' Bank Building, 40 and 42 Wall Street, in this city, will be selected by competitive examination.

The proposition emanated from the architect of the building, Mr. W. Wheeler Smith, and has found favor with the owners.

The advancement which has been made in all classes of domestic engineering within the past ten years is such that a man who is simply able to take charge of a set of boilers and an engine is not fit for these buildings without some preliminary training for the new machinery and duties to be found within them at the present day.

The applicants for situations of this class are many, as the positions are remunerative and the hours not long; consequently, marine engineers with a desire to give up the sea, locomotive engineers who are tired of the road, and factory engineers, janitors, firemen, and occasionally a coachman who has run a heating-apparatus boiler, all make a determined effort to secure the situation by an array of documents, many of them signed by past employers—who, by the way, find it to their interest to now employ other men—or through acquaintances who, for some reason, cannot ignore them, and who have not the firmness to refuse a letter of recommendation which they know they are not justified in giving; for the simple fact is, that most of the writers of these letters, though good business men in their own way, could know little or nothing about engineering, and at most their letters can have no value, except as vouchers for the soberness or general good conduct of the applicant.

The marine engineer of experience in a good class of vessels is undoubtedly a good man to prepare for this class of work, and, with a year or so of experience as a second engineer in one of these buildings under a man who knows his business, will probably develop into a domestic engineer of considerable merit; but, as it is, when first taken from a steamer, with no knowledge of engineering except what he acquired "between decks," he is not the man for these positions. He comes with little knowledge of hydraulic pumping-machinery or elevators, and the paraphernalia of steam-heating and ventilating apparatus, water-meters, tanks, water-supply, drainage, electric-light engines, dynamos and lamps, and the thousand-and-one things now necessary for a first-class office-building or apartment-house, are a mystery to him until he has been about one year in the building.

If during the first year he finds himself in charge, he is in hot water for the greater part of it, endangering the lives of the occupants and traveling public who use the elevators. Then he forms ideas based on his year of blundering in his new field, and his ignorance of the experience and experiments of others in these lines before him, and will generally go to work, if he is allowed, to revolutionize the whole engineering department of the building. He sees ways and means of heating with half the coal used by ordinary methods, and wonders how it is that the people (the whole trade) who have spent a lifetime in the business have been so stupid as not to have seen them. He invents a new boiler, has certain theories of his own about electric-lighting, shows the makers of hydraulic-elevators how they should get the water back to the top of the house again by the weight of the descending passengers, invents anti-sewer-gas plumbing-fixtures, and suggests changes right and left, which, if the owner of the building is not slow to listen to, the engineer will have carried out before he finds the utter uselessness or unfitness for the existing conditions.

Locomotive engineers generally require a longer training before they are fitted for the responsibilities of these positions, and men without a good common-school education should never be entrusted with the care of such a building.

The best class of men for these buildings is machinists or thorough steam-fitters, who, after their practical experience in the shops, have worked themselves through the fire-room and engine-room, stationary or marine, by faithful and intelligent service, and who have either worked on the building as an artisan, a foreman for the engineering contractors, or have had practical experience as engineers of such buildings, the experience to date back not later than three years. Added to this should be a knowledge of the rudimentary principles of mechanical engineering in all its branches, with a more thorough knowledge of the sciences involved in the practice of domestic engineering of the present day, such as the construction and properties of the different kind of stationary boilers, with a knowledge of the strengths of materials, and how to estimate strains, and the general causes and prevention of boiler explosions, etc.; the properties of water and the thermal changes in its conversion to steam; the properties of fuels, their thermal value, and the chemistry of combustion; a thorough knowledge of the steam-engine and the use of the indicator; a knowledge of hydraulics sufficient to make the ordinary calculations pertaining to pumping-engines and water-elevators; the strength of wire cables and the laws of levers and pulleys, simple and compound; and an intimate knowledge of the hydraulic and steam-elevators of the four principal makers. Added to this there should be a full knowledge of the laws and regulations of the Health Department governing the plumbing and drainage of buildings. As a necessary qualification to the above there should be at least one year's service in a building of this class in a capacity not lower than second engineer.

It may appear that we place the standard too high for purely practical men, but not so when it is considered that after the building and its machinery is turned over to the owners, and the architect and engineers who designed the work have retired, the engineer in charge assumes all authority, and that consequently he should have sufficient knowledge to know that what he does alter and design will not unnecessarily jeopardize the lives and limbs of the public, to whom he and his employers become directly responsible when they run and maintain public elevators.

THE NEW ORLEANS QUARANTINE CONFERENCE.

THE conference of members of certain boards of health and sanitary organizations which met at New Orleans June 2, 3, and 4, for the purpose of considering quarantine questions, seems to have been quite harmonious, judging from the reports of the discussions and conclusions of the meeting which have appeared. The Alabama, Mississippi, Tennessee, and Louisiana State Boards were represented, also the Boards of Health of Mobile and Pensacola, the Health Officer of Texas, and the Auxiliary Sanitary Association of New Orleans.

The States rights feeling was strongly in the ascendant, as appeared from the discussion and vote on a proposition to memorialize Congress in favor of the National Board of Health, which was defeated, the Florida, Alabama, and Texas votes being against the board and the Mississippi and Tennessee votes in favor of it. The Louisiana vote is not given, but the discussion showed that the Louisiana Board is opposed to giving the National Board any authority or power.

To keep the balance even, the convention refused to recognize a delegate from the Marine Hospital Service.

It adopted resolutions with regard to the management of quarantine, which we print in another column, together with resolutions relating to international sanitation.

These resolutions sound well, and are calculated to make those who read them contented and happy in the belief that the millennium of brotherly inspection, fraternal notification, and perfect cleansing and disinfecting arrangements is at last about to occur on the Gulf coast. This, however, must be taken with the proviso that the reader is not familiar with the history of quarantine on the Gulf. Those who do know how it is worked will be apt to grin sardonically and to meet the announcement that the devil is dead at last with old Sandy Mackay's advice of "not to bury him until he began to smell a wee strong-like." We do not believe that the system of quarantine and cleansing described in the resolutions will be carried out. Neither the Louisiana nor any other board of health on the Gulf States has the funds necessary to inaugurate such a system or the slightest prospect of obtaining said funds; nor could they keep it up if the entire plant necessary for such a system—hospitals, warehouses, steam-tugs, hotels, etc.—were presented to them. The Louisiana Board pays the expenses of the New Orleans City Board of Health to a large extent out of the fees which it levies in the name of quarantine. It cannot raise these fees, and it cannot spare enough from them to keep up a proper system of quarantine and maintain its own existence.

To provide the necessary facilities for unloading, cleansing, and thoroughly disinfecting a large ship, properly caring for its cargo, observing its crew and passengers, etc., and to do this without exacting fees from the ship which would drive it from the port, requires money—a great deal of money. This money the Southern ports have not got, and are not likely to get from their States and cities; and furthermore, no amount of "tall talk" and "resolutions" will take the place of this money.

A proper quarantine outfit for the port of New Orleans, one that would put her on an equality with the port of New York as regards convenience and safety, would cost over \$100,000, and the wear and tear on it would be great. To run this establishment properly, to employ first-class, thoroughly reliable men, and to do the work as it should be done, would cost over \$25,000 per annum—probably nearly \$50,000. Does any one suppose that either New Orleans or Louisiana will appropriate any such sums as these? Still less probable is it that Alabama or Mobile will furnish the funds necessary to do their work.

And the work will not be done. It will be fumbled, and tinkered, and promised, and resolutely about, but the country will not be protected.

The only power which can both furnish the money and compel the work to be done properly is the United States; and we do not favor the idea of furnishing the money and having no control of what is done with it. The contingency epidemic fund, which is a tax upon the country to repair the neglect and blunders of a small part of it, is not an appropriation which we feel disposed to approve if no steps are to be taken by Congress to prevent such neglect in the future.

We wish it to be distinctly understood, however, that we do not in any way doubt the good faith of the New Orleans Board in its efforts to prevent the importation of yellow fever into its city this year. On the contrary, we believe that it will do its best to secure such prevention, and there are the most powerful motives to induce it to do this. The occurrence of even a very small outbreak of the fever this summer would greatly injure the prospects of the coming exhibition, and we think that the New Orleans authorities may be trusted to be careful, although the quarantine which they will enforce will probably be a very different one from that described in the resolutions.

This conference of the Gulf States looks as if it might be intended to rival, and counteract to some extent, the Sanitary Council of the Mississippi Valley. When Arkansas, Missouri, Illinois, Kentucky, and Indiana give their opinions about the relations of the nation to quarantine matters on the Gulf, we shall have a very different set of

resolutions. Meantime there is little prospect that anything will be done toward securing a really national health organization until another epidemic appears, of which at present there are, fortunately, no special indications.

FAILURE OF THE FOOD LAW.

THE New York State Board of Health has again failed to secure an appropriation for the enforcement of the Food-Adulteration Law. This law was amended in several particulars and passed both branches of the Legislature. One section provided for the annual appropriation of \$10,000, and the Board of Health, relying upon the passage of the bill, did not put an item in the supply bill.

The Governor declined to approve the amended law, and while his reasons for so doing have not yet been published, we understand that it was owing to the fact that the amendatory clause at the beginning of amended sections was omitted. With the exception of the title, therefore, there was nothing to show that the bill in question was amendatory of the law of 1881. The Governor expressed his regret that he could not approve the bill.

It is very unfortunate that the entire work in the suppression of adulteration of food and drugs, with the exception of dairy products, which are provided for in a separate law, should be stopped for want of funds, and especially so where the cause is to be found in the careless preparation of the bill.

WE give elsewhere the bill passed by the Legislature and approved by the Governor of this State, which requires that all telegraph, telephonic, and electric-light wires and cables shall be placed underground before the 1st of November, 1885.

At one time there was some apprehension that the Governor would veto the bill, on the ground that the title was defective in not mentioning telephonic-wires.

The President of the Western Union Telegraph Company has called attention to the fact that there is a statute which gives telegraph companies the right to erect wires, and that this is not repealed by the law just passed. He also says that the effect of compelling the burying of the wires will be the closing of many branch offices, the profits from which will not warrant the expense of placing its wires underground.

The prospect of ridding our streets of wires and poles, even with considerable litigation, does not appear to be very encouraging.

THE TENEMENT COMMISSION.

THE Tenement-House Commission of this city has had several sessions, and is now fully organized and prepared to begin work. At the first meeting all the members in town (nine) were present. J. W. Drexel was elected Chairman, and Dr. Moreau Morris Secretary. Prof. Adler and other gentlemen outlined the work to be undertaken, and a Committee on Organization, composed of Messrs. Wingate, Adler, Esterbrook, Shaler, and Morris, was appointed to draw up a plan of action. This committee recommended the appointment of five standing committees—(1) History and Statistics, (2) Construction, (3) Hygiene, (4) Law, (5) Economy. Each committee is to undertake special duties. An executive committee of three, with the secretary, is to direct the work during the summer, which will consist of a detailed examination of certain defective tenements by a corps of five inspectors, all specialists, and who are to be provided with blank forms, to be filled out with detailed information regarding the nature of the site, size of the lot, nature of the structure, number of rooms, occupants, cubic capacity of rooms, state of general repairs, state of drainage and plumbing, occupations pursued in the building, state of roofs, cellars, halls, privies, water-supply, fire-escapes, plastering, whether there is a janitor, or if the owner's name is posted, amount of rent, etc.

Mr. Frederick N. Owen was appointed chief inspector, and Dr. Anna E. Daniels, of the Woman's Infirmary, Patrick Coyle, President of the Journeymen Plumbers' Society, and David McGinnis, Instructor in Plumbing at the New York Trade-School, were appointed assistants.

The data collected by the corps of inspectors will be collated and used as a basis for examining expert witnesses in various lines in the fall.

The commission adopted these recommendations, and appointed Messrs. Esterbrook and Wingate, and Drs. Hodgman and Morris to act as Executive Committee. In the absence of Mr. Drexel abroad, C. F. Wingate will serve as acting chairman.

OUR BRITISH CORRESPONDENCE.

Bank Holiday at the Exhibition—Dr. Percival on Sanitary Administration of Manchester in 1796—Creosote in Small-Pox.

LONDON, June 7, 1884.

ON Monday last, a bank holiday, 54,579 persons visited the Health Exhibition, a pretty sure test of the hold it has taken as a place of popular resort on the masses of Londoners bent on sight-seeing. Although first impressions no doubt lead one to think that the exhibition has not been very appropriately named, seeing that the casual observer sees very few exhibits bearing on health or sanitary matters, yet a careful investigation reveals the fact that the exhibition does contain many most important sanitary exhibits (especially as the foreign sections are now more complete), but unfortunately they are not placed in so prominent a position as they might be. I understand the editor of THE SANITARY ENGINEER has made arrangements for the appearance of a series of articles on the exhibition, in which all the more important exhibits will be duly noticed by specialists, so that a visitor with this guide in his hands will know at once what is most worth seeing in the various sections of interest to its readers.

The late Dr. Angus Smith, in his "Centenary of Science in Manchester," lately published, refers to a small work by a Dr. Percival, brought out in 1805, and entitled, "Proceedings of the Board of Health of Manchester."

Dr. Percival was a great authority on sanitary matters in his day, and he stated in 1796 that the objects of the Board of Health, which he took an active part in instituting, were threefold:

"1. To obviate the generation of disease, comprehending under this head the inspection and improvement of the general accommodations of the poor; the removal of privies placed in improper situations; provisions for white-washing and cleansing the houses of the poor twice every year; attention to the ventilation by windows with open casements; the inspection of cotton-mills and other factories at stated intervals; the establishment of public baths; the cleansing of the streets and the inspection of the markets with a view to the prevention of the sale of putrid flesh or fish and other unsound articles of food.

"2. To prevent the spreading of disease by contagion, including under this head the speedy removal of those attacked with contagious diseases, isolation of fever cases and purification of the clothes of those affected before they return to their work or mix with their fellow-men.

"3. To shorten the duration of existing diseases and to mitigate their evils by affording the necessary aids and comforts to those who labor under them."

The carrying out of these objects when permitted was productive of much good, but strong opposition was experienced to the proposal to establish a house for fever patients, the people fearing it might become a centre of infection. The medical men of the day met this objection with ample proofs to the contrary, but it was a long time before the short-sightedness and bigotry of the opponents were overcome. However, the long struggle for a house of recovery finally resulted in success, and the committee were able to report a few years subsequently, that, "Happily that scourge of heaven (alluding to the fever which had recently raged with great violence in the city) is now comparatively almost unknown. This important change we ascribe, under God, principally to the House of Recovery, to the salutary effects of which we wish in this manner to bear our public and grateful testimony."

The success which attended the execution of the scheme of a Board of Health in Manchester excited in London and other large towns throughout England a very general desire to promote similar establishments.

Thus we see that at the beginning of the present century Manchester claimed to be and was acknowledged as the teacher of the nation on sanitary matters.

A correspondent has made the suggestion that creosote should be used as a disinfectant for small-pox. He states that it has answered admirably in South America, and he draws attention to the fact that very few small-pox cases are met with in Silvertown or Rotherhithe, two of the east districts of London, in the neighborhood of which large creosote works are situated. He suggests that in the districts where small-pox exists bonfires of creosoted wood should be burned, and gas-tar added if necessary; the fumes given off acting as a powerful disinfectant and freeing the

air from all impurities. Now that London is laboring under a rather serious epidemic of small-pox it might be well to put this suggestion to a practical test.

SAFETY-VALVE.

THE INTERNATIONAL HEALTH EXHIBITION.

No. V.

(Continued from Vol. IX., page 609.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

GENERAL APPEARANCE OF THE EXHIBITION.

IN the former articles on the Health Exhibition the readers of THE SANITARY ENGINEER have been given an outline sketch of the buildings and of the proposed objects and scheme of the exhibition. It is now proposed going systematically through the various sections, pointing out the chief exhibits in each, leaving technical descriptions of particular exhibits for future articles, which are now in course of preparation by specialists. There can be no doubt that, financially speaking, and as a popular place of resort, the exhibition will be a great success, it being already visited daily by many thousands of people. To call it, however, an "International Health Exhibition" does strike one as being a decided misnomer. In the first place, very few foreign nations are at all adequately represented, and this is attributed to neglect on the part of the home authorities, who have not given foreigners sufficient or early enough opportunity to take part. As to the health features, it is true that certain exhibits do bear more or less relation to health and sanitary matters, but they are scattered in all parts of the building, and frequently in the least conspicuous places. The general appearance of the exhibition as one enters it resembles a row of shop-stalls more than anything else, and looks like a gigantic provision warehouse, ornamented here and there by stuffed animals and birds and huge beer-barrels. At any rate, this is the impression one receives on entering the great south gallery from the vestibule, where the first thing that attracts attention is the huge stalls of a well-known firm of seedsmen, where are exhibited several hundred kinds of grasses and wax vegetables, supposed to represent the kinds grown from the seeds of the aforesaid firm, attractive enough in their way, but having no apparent connection with sanitary matters. This stall, which is the most conspicuous one in the exhibition, is further decorated by photographs of the various counting-rooms and working-shops of the firm, showing the employees at work, and there is also a large photograph of the cups and other prizes received by the firm. Passing down the south gallery, we come to cases containing stuffed edible birds and animals, the first case containing, apparently, specimens of "Food from the London market," and the second, "Food from the poultry-yard," but really illustrating the skill of the taxidermist. In this latter case are represented the various breeds of fowls. Next in order comes the Queen's prize heifer, called "Cherry Blossom," which is stuffed entire, and forms an important exhibit in the centre of the room. The rest of the south gallery on the north side is given up chiefly to specimens of drinks and prepared foods, and here most of the celebrated biscuit (cracker) firms are represented. The New York firm of Messrs. Holmes & Coutts have a stall fitted up with various kinds of biscuits, including the "sea-foam wafers," and Messrs. Murray & Co., of New York and Boston, have a good display of sugar goods. In the same hall is exhibited a huge cask of beer, and specimens of Austrian, English, etc., wines and beers. At the extreme end of the south gallery are exhibited pipes, tobacco, etc. Now, to the unsophisticated it is a puzzle to comprehend what possible connection tobacco can have with a health exhibition. The most interesting exhibits of all in this south gallery are the model dairies, and these seem a particular source of attraction for the lady visitors.

THE LONDON WATER COMPANIES' EXHIBIT.

Behind what at first sight may appear to be only an effective and showy display for purposes of attraction, there is, nevertheless, a great deal of striking merit in some of the exhibits. An example may be seen at the water pavilion. Here not only are the exhibits gracefully and artistically arranged so as to attract the general public, but they are also of considerable technical importance and of special interest to the engineer. This pavilion is the

joint production of the eight water companies which supply London and its suburbs with water, and by thus combining together they have been able to produce one of the most interesting displays in the exhibition. Without attempting to describe the beauties of the octagonal pavilion, the central fountain, mosaic floor, and quartz-rock fountains, I will proceed to give some special and interesting particulars of an engineering character, which can be learned by a careful inspection and close study of this building and its surroundings.

The interior is so arranged that each side of the octagon is taken up in the following manner: At the top, close under the dome-shaped ceiling, are two panels filled with oil-paintings of the pumping-station, or intake, of each company; below these are tables containing valuable statistics; below these again are maps illustrating the districts supplied with water, the sources of supply, the lines of mains, and positions of the pumping-stations, reservoirs, etc. Below these maps are sloping desks or tables, upon which, underneath glass, are placed isometrical drawings of the pumping-stations, reservoirs, filter-beds, and other valuable information. At each corner of the four doorways of the pavilion are full-sized and actual sections of portions of the filter-beds in use by each company, so arranged that a longitudinal as well as a cross-section can be seen behind the plate-glass supporting the materials of which these filter-beds are constructed. Scale drawings of these filter-beds, which are full of engineering interest, will be given in the course of these articles. Close to the pavilion, on the north side, in the gardens of the exhibition, water-mains, actually laid, can be seen arranged upon a bank, showing by-pass valves, stand-ports, stop-cocks, and all the actual working of an ordinary street water-main. Here, too, may also be seen a 30-inch pipe, with ball and wicket-joint, as laid in the bed of the River Thames, and by the side of this is a row of double-faced gun-metal valves, ranging from three to thirty inches in diameter. Messrs. Simpson & Co. also show an enormous centrifugal pump, capable of raising 10,000 tons of water to a height of thirty feet per hour.

The eight companies which have contributed to make up this interesting exhibit (given in the order of the magnitude of their supply) are as follows: East London, New River, Southwark and Vauxhall, Lambeth, Grand Junction, West Middlesex, Chelsea, Kent, representing a total subscribed capital of £11,288,342, which, however, owing to the character of the security, is valued at a much larger sum. The table given below, compiled from information which is given upon the tables and maps referred to above, will be found of value, as it contains information never before published.

The East London Company supplies a large district of the metropolis on the north of the Thames, and, as its name implies, in the east end of London; the New River overlaps this district, and extends as far north as Hoddeston; the Southwark and Vauxhall has a large district south of the Thames, extending from Richmond, and including nearly all southern London; the Lambeth Company abuts on this district, and a portion is jointly served with the Southwark and Vauxhall Company; the Grand Junction has quite a suburban district lying to the northwest of London, and its supply is almost entirely on the constant system; the West Middlesex has a district north of the Thames, but it is a curiously divided one, taking in Kensington, Hammersmith, Hampstead, etc., and can scarcely be explained without the aid of the map; the Chelsea Company supplies the adjoining districts lying to the western portion of London north of the Thames, and the Kent Company has an immense district lying on the south side of the Thames, stretching from Greenwich to Farnborough, Dartford, and Swancombe.

In addition to the tables and particulars given above, there are tabulated statements, showing the capital authorized, raised, and expended at the end of each year for each company, together with the income, expenditure on maintenance and management, profit on trading, interest paid, net profit, dividends paid, etc., for each year during a period of ten years preceding the present year, and also some very interesting diagrams, which have been prepared by Mr. Bolton, the Water Examiner, under the Metropolitan Act, 1871, which show the amount of organic elements contained in the water of the different companies from the year 1872 until the year 1882, with a corresponding line showing the annual death-rate during the same period. One of these diagrams will be given in our next issue, and attention called to the effect upon the death-rate or otherwise, which is shown by it.

TABLE RELATING TO THE EIGHT COMPANIES SUPPLYING WATER TO LONDON.

NAME OF COMPANY.	SOURCE OF SUPPLY.	Daily Amount to which Supply is Restricted in Gallons.	Average Daily Supply in Gallons.	Population of Districts Supplied.	Daily Supply per Head in Gallons.	Number of Houses Supplied.	Number of Houses on Constant Service.	Length of Mains in Miles.	Length of Mains Constantly Charged in Miles.	Number of Hydrants or Fire-Plugs.	Greatest Lift by Steam Power in Feet.	Maximum Head of Pressure in Feet.	Minimum Head of Pressure in Feet.
East London.....	Rivers Lee and Thames.	Lee, not restricted. Thames, 10,000,000.	34,091,000	1,076,340	32.40	143,512	119,839	538	190	16,000	335	220	40
New River.....	Springs and wells.	No restriction.	28,383,899	1,038,000	27.34	140,698	20,305	327	219	19,091	270	260	40
Southwark and Vauxhall.....	Thames, at Hampton.	20,000,000	20,270,737	754,003	26.88	101,481	7,958	445	130	11,200	350	170	20
Lambeth.....	Thames, at Molesey and Long Ditton.	20,000,000	15,810,377	538,524	20.6	76,032	28,574	711	150	10,597	380	150	20
Grand Junction.....	Thames, at Kew and Hampton.	20,000,000	14,000,000	430,815	32.25	48,535	30,287	352	262	7,202	210	150	30
West Middlesex.....	Thames, at Hampton.	20,000,000	12,247,000	470,235	25.55	63,808	15,431	401	183	5,000	135	100	30
Chelsea.....	Thames, at Ditton and Molesey.	20,000,000	9,766,600	257,654	37.56	32,797	3,697	215	70	4,018	175	140	40
Kent.....	Wells in the Chalk.	No restrictions.	9,573,493	364,032	26.4	60,679	28,789	443	85	1,460	300	250	50

(TO BE CONTINUED.)

A PLUMBER'S BILL.

AN interesting case was tried recently in the Circuit Court of Detroit, Mich., the plaintiff being Thomas P. Tuite, a plumber, and the defendant, William S. Edwards, a lawyer. The amount involved was \$3.47 for work done and materials furnished by Tuite. Edwards disputed the bill, but offered \$2.70 in settlement, which amount was refused by Tuite. The plumber began suit in a justice's court and obtained a judgment for the full amount claimed. Edwards appealed the case to the Superior Court, where he was again worsted. He now proposes to carry the case to the Supreme Court of the State.

THE beneficial effects of drainage in diminishing phthisis are again confirmed in a discussion going on in England over the priority of the claim of the first authority who prominently stated the fact. Dr. Buchanan had established the fact in 1866 that the drying of the soil effected by sewage-works is generally followed by a great reduction in the mortality from phthisis. Two years before this, however, Mr. O. B. Middleton, in a paper before the British Association for the Advancement of Science, had shown that in the town of Salisbury a great diminution in the number of deaths from phthisis had followed the drainage works. Mr. Middleton considered the chief causes of the disease to be wet subsoil, bad sewerage, and bad water. The indications were to dry the subsoil.

STEAM-FITTING AND STEAM-HEATING.

BY "THERMUS."

No. XXXVIII.

(Continued from page 9.)

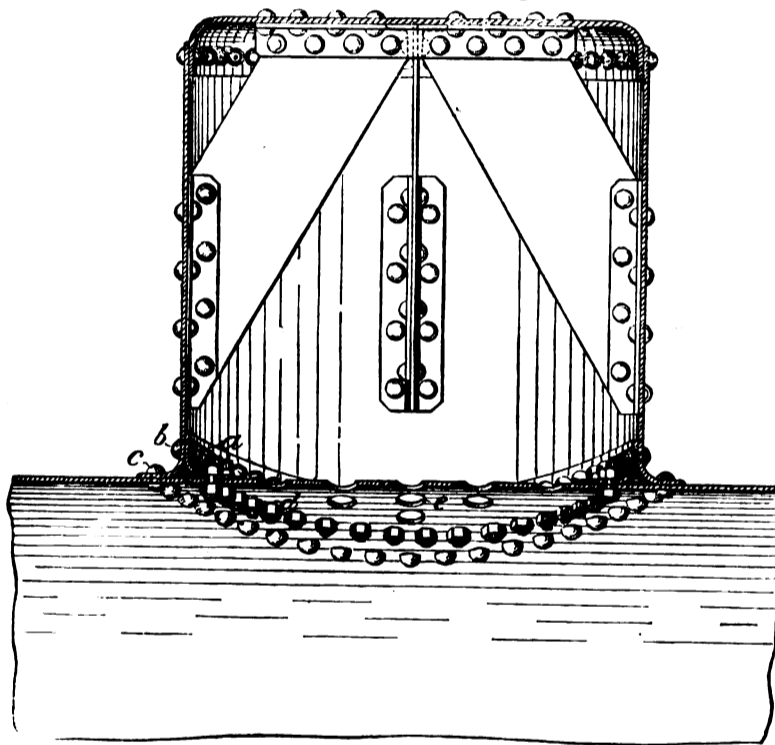
BEFORE leaving the question of the construction and strength of cylindrical multi-tubular boilers, I wish to refer again to the methods of attaching domes to shells of boilers, a subject that was discussed to some extent in Nos. XXX. and XXXI. of this series.

We there showed that when a dome 40 inches in diameter had 64 rivets of but five-eighths inches in diameter in the inside row attaching it to the shell, under the poorest reasonable values, that such a dome would require 300 pounds per square inch to blow it bodily off the shell of the boiler, and that up to this size it was considered perfectly reliable as allowing an ample factor for safety with average pressures now carried, the ordinary routine methods of the boiler-shop only being carried out. But with the growing tendency to carry *higher pressure* for power purposes, on account of the economy due to the greater realization of energy in the cylinders of engines, this strength may not be enough.

A few years hence it is very likely that pressures of 100 pounds per square inch will be as common in newly constructed work as 50 or 60

may cite the part of the United States law relating to pressures allowed on steam-boilers, leaving it to his intelligent customer to figure it for himself, and which reads: "Multiply *one-sixth* of the lowest tensile strength found stamped on any plate in the cylindrical shell by the thickness expressed in inches or parts of an inch of the thinnest plate in the same cylindrical shell, and divide by the radius or half diameter—also expressed in inches—and the sum will be the pressure allowable per square inch of surface for single riveting, to which add twenty per centum for double riveting." This is generally all that is quoted, and the owner of the boiler will proceed this way: "My boiler is 48 inches in diameter and *five-sixteenths* of an inch in thickness, or .31 of an inch, and the iron is marked C. H. No. 1, 48,000, which, according to the rule, must be $48,000 \div 6 = 8,000 \times .31 = 2,480 \div 24 = 103.3$ lbs. per square inch, and to which may be added 20 per cent., as the boiler is doubly riveted, making the pressure allowed to be carried 123.96 pounds." This appears pretty conclusive evidence to the layman, as it appears that a strain equal to only one-sixth of the actual strength of the iron is to be applied to the boiler. But this is entirely erroneous, as 50 per cent. of the strength of the plate is all that is safely realized in the strength of an ordinary single-riveted seam, and say 60 per cent. for ordinary double seams, resulting

that the respective pressures allowed (103.3 and 123.66) are but one-third of the ultimate strength of the boiler in its shell, and where beyond doubt ordinarily constructed boilers are the strongest. However, it is through hastily arrived at conclusions somewhat like the above that the pressures on boilers are sometimes increased to a point that is positively dangerous, based on the strength of the boiler in its strongest part, instead of applying to it a rule analogous to that so frequently applied to a chain—i. e., that its strength is no greater than its weakest link; and that the shell of a cylindrical boiler is its strongest link, while head-sheets, manholes, handholes, braces, domes, etc., all form links of various strengths, but nearly all weaker than the shell, with common practice.



is now, and the desire will be among those who already have boilers on their premises to carry as much steam as their neighbors, when they find it cheapens the cost of power. They will consider that their boiler is as thick and as good as some one else's which is carrying 100 or 110 pounds pressure, and will reason that *their* boiler should be able to carry it also; and the very habit of seeing high pressures indicated will so familiarize them to the matter that the sense of caution which now seems to restrict this class of boilers to a maximum pressure of 60 pounds per square inch will be blunted, until they are suddenly made to realize their danger by a casualty in some of the boiler-vaults of the crowded buildings of our great cities—that something more than the thickness of the shell of a boiler must be taken into consideration to arrive at a just conception of its ultimate strength.

It may be that a cautious man—but one that is given to practicing economy—will go to the boiler-maker who sold or made him the boiler, and get his opinion on its merits and strength, for which he generally has not to pay, as it is only a friendly matter. In the generality of cases of this kind the boiler-maker can safely be assumed to hazard an opinion favorable to the boiler without at all considering the actual facts or conditions of the case; but if he is a cautious business man he

The poverty, even, of the United States law relating to boiler inspection in regard to flat or irregular surfaces is very apparent, and the question of holes in shells, large domes, or irregular construction seems to be left entirely to the judgment of the inspector, excepting the collapsing strength of flues and tubes.

With regard to flat surfaces the law says: "Where flat surfaces exist the inspector must satisfy himself that the bracing and all other parts of the boiler are of equal strength with the shell, etc.," but gives no positive instructions except that "no brace or stays shall be allowed a greater strain than six thousand pounds per square inch of section," meaning, of course, cross-section. This latter is good, as it gives a factor of safety of eight for average iron, but as the factor for safety on shells is only three, there appears to be something inconsistent in informing the inspector he must see that the braces are of equal strength with the shells.

But can we have a factor of safety of three on shells when we cut large holes through them, or when flat surfaces pull against cylindrical ones, or when a tight brace carries three or four times the area of plate that has been intended for it, while its neighboring braces are slack? It is these general conditions which determine the strength of a boiler, and from nothing but an intimate knowl-

edge of these conditions by a careful inspection can a safe estimate of the strength of a boiler be made. When a man says he has a factor of safety of three or four when speaking of a boiler, what is to be understood by it? Is it that he can load the boiler to three or four times a greater pressure than that at which he intends to carry steam, before it should be expected to burst, knowing that all its parts are of nearly equal strength and harmonious in design? Or is it that he thinks when he compares it to what it should be, figuring according to the strength of the shell, that his margin is great enough to cover the defects of construction and design, and that *probably* there will be enough to spare to make the boiler safe for all practical purposes? In other words, is the factor for safety in a boiler to cover the variations in strength and probable defects in materials, or has it to cover defects in materials and design?

It should cover only defects in materials and workmanship that an engineer cannot guard against, and deterioration due to time and usage, at least in the class of boilers we have to deal with; but with the usual run of boilers that are now going in under a general specification with close competition and no inspection, the greatest dangers are to be feared from faulty design, should pressures in excess of 60 pounds per square inch be carried on them.

It is for this reason I here introduce a method of reinforcing a dome on a boiler when very high pressures are to be carried. Domes up to 30 inches in diameter it is not necessary to consider, as the area of the number of five-eighth rivets, or larger, required for the inside row of rivets have section sufficient to make them safe beyond a doubt, but with 36 to 40-inch domes, if high pressures are to be carried, the precaution does not come amiss, and with 42-inch domes and larger, this method, or its equivalent, is a necessity.

In the diagram, *a* is a ring of flange-iron turned and welded at the butts so as to avoid a riveted lap. It is then flanged inward so as to fit the circle of the shell of the boiler in a similar manner to that employed with the flange of the dome, except that the latter is turned outward. The size of the ring is such that it fits within the dome, and is fastened to it by the row of rivets *b*. The dome and ring is then set on the shell, and the dome-flange secured in the ordinary manner with a row of hand-driven rivets, *c*, while the flange of the ring *a* is secured by the bolts and nuts *d*. This method is necessary if a number of small holes, *e*, are made in the shell instead of a large hole, for reasons before explained in these papers, but if instead of making a number of small holes a frame somewhat similar to a manhole-frame is set across the shell of the boiler under the dome, so as to compensate for the strength of the metal cut out, a hole sufficient for a man to pass may be made under the dome, when the following method may be applied: Instead of using bolts at *d* use rivets; let the ring *a* be first placed on the boiler, and the rivets *d* driven; then place the dome over the ring and drive the rivets *b*, "holding them on" through the reinforced hole, after which the rivets *c* may be driven in the usual manner.

(TO BE CONTINUED.)

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

No. XX.

(Continued from Volume IX., page 611.)

LINING SINKS AND CISTERNS.

ORDINARY-SIZED cisterns are generally lined with 6-lb. lead sides and 7-lb bottoms, but for best work and large cisterns 7 and 8-lb. is very often used. Small-sized cisterns are usually lined with lead of the same substance throughout, and in one piece, with the angles cut out. The plumber generally opens out his piece of lead and carefully takes out the creases with a leaden flapper, so as not to bruise or indent it; he then marks out the part for the bottom, and then the

sides and ends, allowing in all cases for the thickness of lead, so that it will not fit too tight in the wooden case or shell. At each angle is left about half or three-quarters of an inch on the side that will form the under-cloak, as shown by dotted lines, A, A, Figure 1, and corners are left on, as at B, B, so that when the lead is turned over the top edge of the cistern they shall meet in a mitre.

The lead is now soiled about three or four inches wide around the parts to be soldered, and when dry they are shaved either with a gauge-hook or an ordinary shave-hook and straight-edge, the part at C being shaved with the hook-compasses. Great care should be taken when

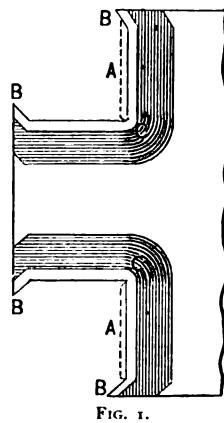


FIG. 1.

shaving the straight parts not to dig in the point of the hook so as to unnecessarily reduce the substance of the lead, and neither should the shaving be too wide, in which case the lead would not have the parts which are thinned by the hook strengthened by the solder. Some men think that by shaving wide angles it makes them appear to be stronger, whereas the reverse is the case, as it is very rarely that the solder is left full up to the edge of the shaving, as was explained in one of the chapters on "Joints."

Figure 2 shows a section across the soldered angle of a cistern, showing the shaved parts filled up with solder right up to the edge, and Fig. 3 the common way and the evils complained of at the parts marked E, E. Some reasons why this should be insisted upon will be referred to

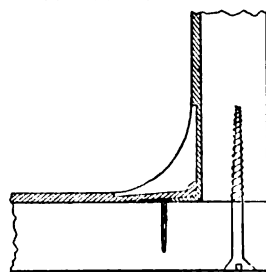


FIG. 2.

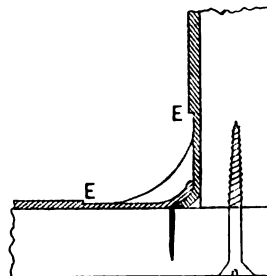


FIG. 3.

further on; so we will imagine the piece of lead prepared, soiled, and shaved as described; the piece to form the under-cloak at the angles should have its outer edge rasped down to a feather-edge, so that the over-cloak part may lie quite smooth over it. If this was not done it would be very difficult to wipe the angle nice and true and leave the solder of a proper substance at the edges. These under-cloak pieces should have a sharp-pointed hook run so that they will fold up without any dressing or knocking about to dirty the shaving or scratch the soiling, which would necessitate its being done over again. The sides should

next be folded upward and the angles around the bottom "set in" with the edge of a dresser, but not too sharp, and only sufficient to crease the lead in straight lines. These angles should then be dressed well on the outside; if this is properly done the lead will not have become reduced in substance, whereas an indifferent tradesman would have set in these angles so sharp with his dresser as to nearly cut the lead through.

The bottom should now be bellied or hollowed from the underside; the flat of the hand is quite sufficient for this, and the use of tools should be avoided as far as possible. The sides should be bellied inward in the same manner. The result of this bellied is to make the lead when turned up rather smaller than the wood case it is going into, so that it will drop into its position without any dressing; if the lead should be rather tight, by lifting up one end of the cistern a few inches off the floor or bench and allowing it to drop, and then the other end in a similar way, the lead will generally shake down to the bottom. The sides with the under-cloaks attached to them should have their edges pressed into the angles of the wooden case and then the bellied part pressed back with a smooth piece of board; the other two sides should be treated in the same manner, and the result will be that the lead is home in the angles without any dressing or working of any kind. A piece of board should be laid in the bottom and the plumber should stand upon it to press down the bellied of that part and so force the angles of the lead back into their proper position tight up to the woodwork. An iron punch or a blunt chisel can be used with advantage about every three or four inches in the angles of the parts to be soldered, so as to punch in a series of little spurs to prevent the angle opening by the expansion of the lead when the solder is poured on. About two or three inches from the top end of these soldered angles a copper nail with a tinned head should be driven in, but only one to each angle, so as to fasten down the lead and keep it from rising off the bottom when the top edge is worked over on the woodwork. Some men will run a knife or the point of a shave-hook on the back side of the lead and on a level with the top edge of the wood cistern, so that the lead will fold over and leave a straight and sharp arris without much dressing, and although when this is done the work looks smart and free from tool-marks, still it should be condemned, as it will not be so well able to support the sides of the cistern, which, to a certain extent, are suspended from the top. It is a common practice to have the top edge of the cistern dished or hollowed at the angles, so that the lead can be dressed into it, and then where it meets in a niche it can be soldered "flush."

The cistern should now be placed on its side or end, so that the under-cloak piece stands upright, for if this lies flat it sometimes happens that if the lead does not fit tightly in the angle, solder will get underneath and so get wasted, in addition to making the surface of the lead so uneven that the wiping looks irregular and patchy, for a plumber can no more wipe an angle straight if the sides are not flat than a plasterer could run a straight cornice or molding if his running rules were not straight.

It is always best *not* to "touch" or grease the angles of a cistern until after it is lined, as there are always dust and bits of rubbish about that stick to it, and when it is "touched," some should be rubbed on the soiled portions as well, as the solder does not stick to it so much, and the metal works freer. Good thick cloths should be used for wiping cisterns; a thin one is sometimes useful to get away from the start, as a thick one would leave a great lump in the corner; but a good thick one is best for straight-away work—so thick that only one finger is necessary, and so that pressure can be applied to it. A thin cloth gets so hot as to burn the hand; it also requires two, and sometimes three, fingers behind it, so as to press on the edges of the soldering and so wipe them clean and avoid the necessity of trimming them afterward with a pocket-

knife at the risk of cutting half through the lead as well; and, speaking from experience, when using a thin cloth sometimes more pressure is applied by one finger than by another, and the soldering is not of equal substance throughout, or on one edge the lead shows and on another an extra thickness of solder is left. When three fingers are used with a thin cloth it is not at all uncommon for the little finger of the wiping hand to keep touching the spare solder at the side of the wiping, and so get burnt, and sometimes a piece will get under the finger-nail causing great pain. Care should be taken to keep the lead pressed tight back to the woodwork when soldering, for as soon as the hot solder is poured or splashed on the lead expands and bulges out, and this must be pushed, not dressed, back before commencing wiping, as if done afterward when the metal is partly set and in a brittle condition it frequently cracks, but this crack is generally so fine as to be invisible. Some men will have a small piece of wood about eight or ten inches long to press back the sides, but others push it with their cloths, and as the lead is very soft from being heated, it generally goes back very easily. The process of wiping is very difficult to describe; five minutes' practice would be worth more than pages of writing about it. The points to be attended to are to properly prepare everything as described, taking care that the shaving is perfect, and to have a good heat, but not hot enough to burn holes in the lead for the solder to run through; the irons should be hot, but not so as to burn the solder and convert it into dross; pour on sufficient solder to go a few feet, but not too much, as that which is behind the worker gets cold and so has to be heated up with the iron; as soon as a heat is got up begin wiping while the solder is in a semi-fluid condition, and don't play with it until the heat is almost lost, or until the metal is half cold, so that it pulls apart or perhaps away from the lead. A good plumber will keep his iron at work heating up the solder at one part while he is wiping the portion already heated. A good many men in trying to do this have their attention so riveted on their wiping hand that they forget to use the iron, and the result is that their angles look patchy; others again will keep their iron buried in the solder to keep it heated, but forget to keep moving it about, and the result is that it often burns a hole through the lead in such a way that perhaps he has to stop soldering until he has shaved around the hole so as to solder it over.

(TO BE CONTINUED.)

THE PLUMBERS' LOCK-OUT IN N. Y. CITY.

THE Association of Master Plumbers of New York City has held several meetings during the past ten days, the special business being the "strike" of the journeymen plumbers employed by Mr. John Toumey.

The trouble was caused by Mr. Toumey having discharged one of his men for insubordination, whereupon the Journeymen Plumbers' Society demanded his re-instatement. This being refused, the strike was ordered.

Mr. Toumey appealed to the Master Plumbers' Association, which appointed a committee of conference with the journeymen. These committees, however, failed to agree upon terms of settlement, and at a special meeting of the master plumbers on the 18th inst., the following resolution was passed:

"On Monday, June 23, each master plumber will discharge every journeyman and apprentice in his employ who is a member of the journeymen plumbers' organization, and we will not employ any man or boy who is a member of said organization."

The following pledge was also adopted, and has since been signed by about one hundred of the master plumbers:

"We, the undersigned, master plumbers, doing business in the city and county of New York, do hereby pledge our words and sacred honors to abide by the action of the Committee on Strikes in all matters pertaining to our business during the continuance of said strike; and, further, that we will not, directly or indirectly, employ any journeyman or apprentice who is a member of the Journeymen Plumbers' Association during the pending strike, or until the committee publicly or officially declare the strike ended."

It was also agreed to require the signatures of journeymen to the following pledge before they be permitted to go to work:

"I do hereby solemnly declare that I am not a member of any journeymen plumbers' organization, and that I will not in the future join or become a member of any now existing organization. To the truthfulness of the foregoing declaration, I hereby pledge my word and sacred honor as a man."

A MILK DAIRY AND AN EPIDEMIC OF TYPHOID FEVER.

THIS report*, forming a pamphlet of twenty-three pages, with one plate and a map, is highly creditable to its author, Dr. F. C. Curtis, and is the first careful and satisfactory investigation of an epidemic of typhoid, due to contaminated milk-supply, which has been published in this country.

Port Jervis is a village containing between eight and nine thousand inhabitants, and is situated in the eastern part of Orange County, on the Delaware River. The soil is a compact sand covered by alluvium, and the numerous wells are sunk into this sand from thirty-five to forty feet in depth. The village has been fairly healthy, no special epidemics having occurred in it. A few cases of typhoid fever have usually occurred every fall. During the last six weeks of the summer of 1883 it was very dry, and then in September there were several very heavy rainfalls. At the end of September and the beginning of October scattered cases of enteric fever began to appear, and by the 24th of October the epidemic may be said to have fairly commenced. From September 28 until the end of the year there were 148 cases of well-marked enteric fever, besides a number of cases of mild fever of somewhat doubtful character, but which were not regarded by the physicians as true typhoid. The epidemic was entirely limited to the village; in the surrounding country there was no participation in it. The cases were scattered throughout the village, not being limited to any particular part, though more numerous in certain localities. In one section called "Brooklyn," a well-built portion on elevated, well-drained ground, and thence along the main residence street in the upper part of the village, numerous cases occurred.

A characteristic of the epidemic was the plurality of cases in individual households. In about thirty families there occurred more than one case, in seven there were three cases, in four, four, and in three families five cases each.

An investigation of the water-supply showed that it was almost impossible that it should have had anything to do with the outbreak. Some of the wells may have been contaminated, and may have caused a few scattered cases, but in many cases the sick had not used well-water at all, while the public water-supply was of good quality and could have had nothing to do with causing the outbreak.

Port Jervis, like most other villages, has no sewerage, and, as usual, house-wastes are discharged into yard cesspools. These are not water-tight, and as a rule, are never emptied, since the fluid contents leach out of them. Yard privies are in general use, the receptacles being usually shallow pits built of boards. No doubt these cesspools and privies are a source of disease, and may have conveyed the contagion in some scattered cases, but the history of the epidemic points to a different cause. Of the 148 cases of typhoid, 128 occurred in sixty-four families which received milk from one milkman, and in one-half of the families supplied from this source typhoid occurred. Out of the 9,000 inhabitants of the village but 500 used this milk, and all of the cases of typhoid except twenty-two occurred among this group of 500 persons. This milk came from a farm about three miles from the village, and three cases of typhoid fever occurred in the family managing this farm during the months of August and September, 1883. The description of the farm buildings and of the methods of handling the milk show that the milk might have become infected by the pollution of the well water, or through the cloths used in washing the cans, or through the persons handling it who were in constant communication with the sick. The outline of the route of the milkman who distributed this milk is very well shown by the locality of the cases of fever in "Brooklyn" and along the main street.

It will be seen, therefore, that Dr. Curtis seems fully justified in his conclusion that the epidemic was caused and spread through the medium of infected milk, and that the Port Jervis epidemic must be added to the already long list of similar outbreaks due to this cause.

HOW PLANTS MAY PURIFY THE AIR AND THE SOIL.

THE beneficial effects which plants and trees may produce on dwelling sites and on the air of habitations have

*Report on the epidemic of enteric fever at Port Jervis. (Extract from the fourth annual report of the State Board of Health of New York.)

been made the subject of a paper by Dr. James Evans before the South Carolina Medical Association. The network of fine fibrous roots of trees and plants, traversing the soil in every direction, feeds on the organic matter which would otherwise undergo decomposition, polluting the soil, air, and surface-water. The vegetation also absorbs excess of moisture and drains the soil. This moisture is afterward exhaled from the leaves, and there is no doubt that plants also exhale, with the moisture, some of their active and peculiar principles. The scent of mint and thyme is due to menthol and thymol, antiseptics of the highest value, and it is not improbable that their exhalations have the same property. The eucalyptus is remarkable as a prophylactic against malaria. Its leaves immersed in hot water are also said to be an efficient disinfectant in the sick-room. By virtue of their power to generate ozone and to split up carbonic-acid, absorbing the carbon and setting free the oxygen, plants remedy to some extent the evils of bad ventilation. In Pasteur's virus-culture experiments he found that, when they were conducted under a diminished supply of oxygen, the germs retained their primitive virulence, but, on the contrary, when they had access to oxygen the virus became weaker. It has been known, for a long time, that marsh miasms is intercepted by a forest, and that persons living in localities so screened are exempt from attacks of malarial fever. The explanation of this is probably to be found in this discovery of Pasteur. When a cloud of malarial germs are wafted from a marsh to the neighboring forest, they encounter a continuous stream of oxygen pouring forth from every leaf, attenuating the virus and rendering it innocuous.

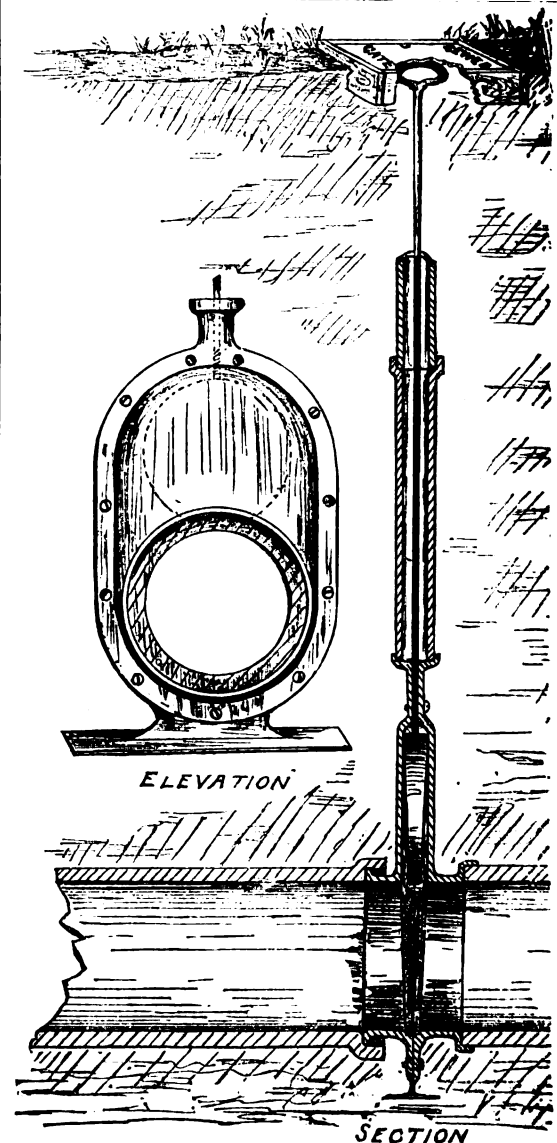
SEWER-GATE.

LOWELL, May 24, 1884.

To the Editor of THE SANITARY ENGINEER:

I SEND you by this mail a sketch of my flushing-gate, and the manner in which it is used. It is made with a sliding-stem instead of a screw, for the reason that it can be opened to its full size in an instant. At the point where the stem goes out the gate is provided with a babbitt-metal bearing, so as to be non-corrosive. The top is made in the form of a socket of a size to receive a 2-inch clay-pipe, the same to be extended to the surface of the ground and connect with a suitable iron cover. The bottom is provided with a foot, to be built around with cement and brick to keep it firm. I have tried many ways, but have never found any to work as well as this. It gives a column of water the full size of the pipe, and it goes out in a perfect torrent.

Yours respectfully, ARTHUR STAPLE.



AN EXAMINATION PAPER IN PLUMBING.

At this time, when practical instruction in plumbing in such schools as that established in this city by Mr. Auchmuty, or by the Master Plumbers' Association of Philadelphia, is attracting much attention, it will be interesting to note just what are the classes of subjects gone over by the plumbing classes of the City and Guilds of London Institute. So we publish below the questions on the examination paper submitted to the students at the Guild examinations last month. We are indebted for a copy of the paper to a correspondent in London who is thoroughly familiar with the London course of instruction, whose letter we printed at page 53 of our last issue.

PLUMBERS' WORK.

Instructions.

The candidate must confine himself to one grade only, the Ordinary or Honors, and must state at the top of his paper of answers which grade he has selected. He must not answer questions in more than one grade.

If he has already passed in this subject in the first class of the Ordinary Grade, he must select his questions from those of the Honors Grade.

The number of the question must be placed before the answer in the worked paper.

Three hours allowed for this paper.

Ordinary Grade.

[Not more than twelve questions to be answered.]

1. Describe the principal physical qualities of lead.
2. Write out a list of tools required by a plumber.
3. There are various kinds of traps, "bell" traps, "D" traps, "S" traps, "lip" traps, and "ball" traps. Sketch one of each, and say under what conditions you would prefer the bell-trap.
4. Sketch what is called a pan-closet with its container, and with the ordinary D-trap, and explain in full detail the disadvantages of the whole apparatus.
5. Sketch a valve-closet apparatus, with syphon-trap, and explain its advantages over a pan-closet with D-trap. Draw also any form of (wash-out) closet with which you are acquainted.
6. Sketch a piece of soil-pipe with the best kind of joint, in section, and state how made. Would you use a wipe-joint or a flange-joint? Would you use a copper-bit or a blow-pipe? Which joint would stand the longest, and prove strongest if tested by the usual machinery?
7. A soil-pipe is usually four inches in diameter; what should be the size of the ventilating continuation of such a pipe?
8. How does sewer-air affect (1) soldered lead soil-pipes, and (2) drawn lead-pipes, where there is no ventilating continuation of the soil-pipe in either case? What is the proper weight for lead soil-pipe per foot, superficial?
9. You may be frequently asked to lay down drain-pipes inside a house, in a row of houses. With what material would you joint or lute your pipes? What is the least fall in inches, which you would give them in every ten feet, and with what protective material would you surround them?
10. Supposing you were laying down a 9-inch drain and found it necessary to interpose a syphon-trap, what diameter of syphon would you use? Sketch also the pattern which you would use. Do you know any condition of things which would necessitate the use of a syphon, with an upright in the centre of the hollow portion?
11. What is understood by "disconnecting a house-drain from the sewer?" Sketch the necessary apparatus according to any system you know best.
12. What is meant by a "box" gutter, and what are its disadvantages?
13. Sketch a hydraulic-ram, and state its powers for lifting up water with various sizes of pipes, and at varying distances.
14. Describe the several ways in which the wells of a house can be contaminated, taking into consideration all the common waste of a country house.
15. You have to deal with a house where there is only one cistern, the service from which leads to sinks, baths, and lavatories and closets alike. How would you disconnect the closets from the cistern, and what would each disconnection cost? Sketch the cheapest apparatus.
16. If you were asked to clean out a lead-lined cistern, explain exactly how you would carry this out, and what you would make use of for the purpose.
17. Sketch a wet-gas meter and a dry-gas meter, and describe the action of each.
18. What are the chief disinfectants in use? Mention four of them, and how you would apply them in various cases.

HONORS GRADE.

[Not more than fourteen questions to be answered.]

1. Describe some of the principal chemical qualities of lead.
2. Describe the difference between red-lead and white-lead, and explain how each is separately obtained. Describe also the uses to which these two materials are usually put.
3. At what degree Fahrenheit does lead fuse, and what occurs in castings of lead which are rapidly cooled? Can you imagine how the sudden cooling of a leaden trap or soil-pipe could affect the healthfulness of a building?
4. State, approximately, the cost of pig-lead per ton, and also the weight of silver generally found in a ton of lead.

5. Describe all the various kinds of solder with which you are acquainted, including plumbers' metal, tinman's fine solder and ordinary hard spelter-solder; and state of what ingredients each is made, and the relative cost.

6. How do different waters affect lead, zinc, iron, and tin.

Describe the difference between tinned lead-pipe and tin-encased lead-pipe.

7. There is a certain chemical solution of a very common nature which Dr. Christison said should always be put in a lead cistern for a short time in order to cover the interior with an insoluble protective film; what is this material?

8. By what formula would you compute the quantity of water passing through various sized pipes, from various distances, and from various elevations or "heads"?

9. Explain how the quantity of water flowing down a rivulet or stream may be gauged with the view of ascertaining if it be sufficient to supply a household.

10. What advantages do iron drain-pipes offer over glazed-earthenware socketed-pipes?

Describe the method of making the joints in both, and give the relative cost in each case, taking the earthenware-pipe to be laid on a concrete bed and surrounded with three inches of concrete.

11. Draw (as nearly as possible to a uniform scale) a pan-closet, a valve-closet, and any closet which is comprised in one piece of earthenware. State which you consider to be the most healthy for usage, and why you prefer one and condemn the other.

12. It is supposed that the underground drains of a house are in a leaky condition, and that the upright soil-pipes are also suspected; what means would you take to test the soundness of both? Describe the various means of dealing with both, and what materials you would use, it being understood that only one entry would be allowed to be made into the underground drain, and the foot only of the soil-pipes exposed.

13. Setting aside the ordinary cesspool system, how would you propose to deal with the sewage of a small house with a quarter of an acre of kitchen-garden so as not to affect the health of the inmates?

Describe any systems of irrigation with which you are acquainted.

14. In an interior courtyard, with a number of windows in the elevation, you have the option of erecting a soil-pipe in lead or iron, which would you prefer—1st, for cheapness; 2d, for soundness—and how would you make the joints in each case?

15. State the advantages or disadvantages of a soil-pipe fitted by way of a finial with any cowl with which you are acquainted.

16. In the country it is very common to find houses, the inmates of which are obliged to rely entirely upon rain-water. How would you compute the quantity of rain-water available for their use, and what size of tank would it be necessary to provide with a given superficies of roof? As rain-water is very frequently impure, how would you filter it—1st, before it entered a cistern in the roof, and 2d, before it entered an underground tank? Sketch any apparatus with which you are acquainted, which for a few minutes washes the impurities from the roof and delivers them into the common drain before delivering water into the drain leading to the rain-water tank.

17. Supposing that you were called to a house where an infectious disease had prevailed, and the house was vacated, how would you proceed to disinfect it, beginning with the basement and ending with the top story; and what disinfectants would you use? What do the various disinfectants cost?

18. Sketch any illuminating-gas regulator with which you are acquainted and describe its action.

19. You are called to a house and you are asked to show that there is no escape of illuminating-gas; what steps would you take to satisfy yourself and your client as to the condition of the pipes, and on what indications, other than those of the sense of smell, would you rely in testing the soundness of the pipes?

Correspondence.

FEEDING BOILERS.

COLLINGWOOD, ONT., June 17, 1884.

To the Editor of THE SANITARY ENGINEER:

Will you favor a novice at steam-fitting with an answer to the following problem? There is a manufacturing establishment in this town which uses six steam-boilers. These boilers are 27 feet long and 4 feet in diameter, and are in two gangs of three boilers each. The water, until this spring, was fed into the boilers by means of two mud-drums, H H, under the boilers, from a Blake double-acting pump, A, which has a water-cylinder of 6 inches diameter and suction-pipe of 5 inches. There were two branches from the pump, one for each gang of boilers. The heaters, B, B, are close to the pump and about three feet from the boilers. The water, after leaving the heaters, went into the mud-drums through the pipes G', under each gang. These mud-drums were 14 inches in diameter and 26 feet long, and were set at right angles to the boilers. They were connected to each boiler by pipes 10 inches long and 6 inches in diameter. This arrangement always gave good satisfaction, so far as the feed was concerned.

The mud-drums showed signs of old age this spring, and the company decided to do away with them. They did so. The holes in the bottoms of the boilers were closed up, and a hole cut in the back end of each boiler 3 inches in diameter. A 2-inch pipe, G, was led from each heater

around to the back of the boilers, and was then connected with a 3-inch pipe, C, on each gang. These 3-inch pipes have tees in them opposite each boiler, and a 3-inch pipe, C', from the tees to each boiler.

This arrangement materially increased the length of pipe. The furthest gang has now 60 feet of pipe, without including the heater, which has seven 2-inch pipes, 7½ feet long.

In pumping up the boilers after repairing, everything worked like a charm; but when steam was got up we could get no water through the pipes at all, except by running the pump at such a high rate of speed as to threaten the destruction of it in a very short time.

At first we thought it was the pump. It was taken apart and found to be in first-class condition. It had been to the shop this spring, bored out, and put in good shape.

How can you explain what is the matter? The company owns three establishments of this kind, situated in different parts of the country, and the engineer of one of them has a sort of supervision over the whole. It was by his instructions that the change was made, and now, when it doesn't work, he condemns the pump, but cannot find anything the matter with it. Now, Mr. Editor (1), what difference would it make to have the pipes from the tees in feed-pipe to the boiler reduced to two inches? This would give a 2-inch feed into a 3-inch and 2-inch to the boilers. (2.) What would be the pressure on the pump if the feed was put into the mud-drums again? The boilers carry a working pressure of sixty pounds.

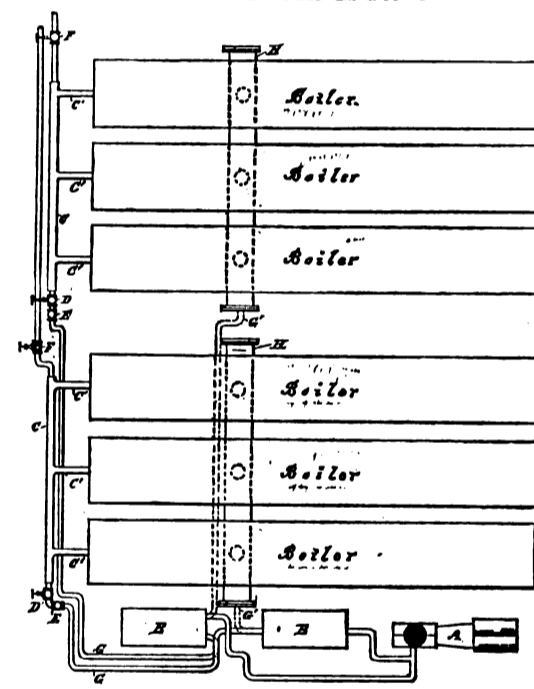
I hope I have made this plain for you to understand what I mean, and, in case I have not, I inclose a diagram showing the position of boilers, etc., etc., and the change in the pipes.

Kindly publish an answer in your valuable paper at your earliest convenience, and much oblige,

Yours respectfully,

A CONSTANT READER.

[1. It would do no good to reduce the pipes C'. The size of the pipes have nothing to do with pressure, except



in so far as the resistance to the flow is increased or decreased with the diameter of the pipe.

2. The pressure on the water-end of the pump is the same per square inch as the steam carried on the boiler, plus the weight of a column of water equal to the difference of level of the water-line of the boiler and the pump; added to which must be the resistance to the flow of the water through the feed-pipes and heaters when you are pumping. This resistance is generally an unknown quantity, and increases in a ratio about as the square of the velocity of the flow, and directly as the length of the pipes when they are straight or nicely curved, but in a much more rapid ratio in ordinary screwed pipes and fittings.

In your case, as the pipes are now fitted, the resistance to the flow is enormously increased over the old method, and presumably you have reached a point where the leakage passed the piston and back through the valves is such that only by quick running can sufficient water be forced through the pipes.

You give no data by which we can find the quantity of water used per hour, but assuming each boiler to be 60 horse-power, the quantity of water used per hour cannot be short of 14,400 pounds, and probably reaches 16,200 pounds per hour. As the pumps for any boilers should be capable of adding four times as much water as the boilers can evaporate in a given time, so as to be able to "catch up" should they be stopped for a time, and for other

obvious reasons, it will in your case require a pump capable of adding water to the boilers at the rate of, say, 60,000 pounds per hour, or 1,000 pounds per minute, to do which the velocity through a 2-inch pipe at the pump will be 12 feet per second, and the pump will have to run at the rate of 120 strokes to the minute, if the stroke of the pump is 8 inches, making no allowance for leakage under valves, clearance, or loss in any way, which may bring it up to 150 strokes per minute.

The forcing-pipes, G, are too small in diameter, as the velocity per second through a single one of them will be 6 feet per second. One foot per second is a fair velocity through a feed-pipe and its valves and bends.]

CELLAR VENTILATION.

HOBOKEN, N. J., June 12, 1884.

To the Editor of THE SANITARY ENGINEER:

CAN you inform me if there can be any improvement made in the ventilation of a cellar 100 feet in length and eight feet in depth, area in front and rear, partition from side to side, about fifty feet from the front? Can there be an air-shaft built to connect with the chimney without affecting the draft, and if so, in what manner? Please answer in your answers to correspondents, and oblige,

Yours truly, NEWSDEALER.

[We have no doubt that the ventilation of the cellar in question can be improved, but how this improvement should be made is a question which cannot be answered without much more knowledge of the circumstances of the case than is furnished by our correspondent. What are needed to answer such a question intelligently are plans and sections of the building, showing location and dimensions of existing flues, and a description of the means of heating employed. As chimneys are usually built the flues are not large enough to have air-shafts carried into them, so as to produce much good effect without interfering with the draught. Probably the chief difficulty in the case in question would be to get the fresh air in, in cold weather, without making the rooms uncomfortable.]

CURIOUS PROPERTIES OF COAL-GAS.

MR. THOMAS FLETCHER recently delivered a lecture on the above-mentioned subject at Cheltenham, England. The lecturer went over ground already more or less familiar, but as the subject is one of constant interest and importance, we give the larger part of the lecture, as reported by the *Gas and Water Review*:

"When we consider how long gas has been in common use, it is surprising how little is known concerning its use. Until within the last few years most people have been under the impression that it was merely a means of obtaining light, and even for this purpose it has been, and, I may say, still is, most wastefully used. The majority of the people seem to think that if they only burn a quantity of gas it matters very little how the gas is burned, or what burners are used. As an example, I often see ordinary sitting-rooms about the size of my own—i. e., 15'x20'—lighted by three or four burners, each being most carefully inclosed with opal or ground-glass globes, which waste about half the light. My own sitting-room is lighted by one No. 8 Bray's burner, and I may safely say that few rooms are so well lighted. People are not generally aware that one large burner gives far more light than two separate burners, each consuming 4 feet per hour, and that one burner without shade is about as good as two with opal or ground-glass globes. Many people prefer the appearance of burners with glass globes, but they must bear in mind that this entails a much larger gas consumption for the same light, and also more heat and vitiated air in the rooms. There are burners made of two small ones joined at a certain angle, which are said by the makers to give a great increase of light for the same gas consumption. The fact is that, as I show you, two burners each burning 4 feet per hour, give far more light when both flames are joined in one, but they give little, if any, more light than a single good burner burning 8 feet per hour, and the compound burners are extremely liable to cause black smoke when turned low. I show you the two arrangements side by side, and you will see the fact clearly without further proof, although, of course, my experiment is a rough one. The truth of what I tell you has been proved by photometer tests repeatedly. There is another point not generally known, that if a burner is placed at such an angle as to give a flat or saucer-shaped flame, the light is greatly increased, but this has a similar objection to the compound burner—it is liable to smoke if turned low. A great argument against the use of gas is the smoking of ceilings, etc., and curiously enough these complaints come strongest from

those people who burn their gas carelessly under excessive pressure without control, and under such circumstances that smoke is almost impossible. The liability to true smoke occurs only in places such as open shops, where the flames are blown about very much, or in those places where first-rate burners are used under the best conditions—that is, just verging on the smoking point. The fact is that the supposed smoke is not smoke at all; the discoloration is gray or brown, not black, as it would be with smoke, and is, I think, caused only by the dust in the air being more or less burnt, caught in the ascending current of hot air and thrown against the ceiling. When the gas is first lighted the ceiling is cold, and the water formed by the combustion of the gas condenses, forming a surface to which dust readily adheres, and if we use any burner, whether oil or gas, in one fixed position, the discoloration above it is exactly the same, depending entirely upon the power of the burners used. When the servant lights the gas on a dark morning and proceeds to clean up the fire-place and dust the room, she does practically all the smoking of the ceiling which takes place; once the dust settles little discoloration occurs after. I cannot keep you here six months to prove this practically, as it really occurs; in fact, the dust in the air is so minute in quantity that it takes a long time to produce visible effect, but I have seen sufficient of the results with experimental burners to be practically certain that this is the only cause of the so-called smoking of ceilings. It can be prevented to a great extent by a shade of any kind over the burner. The reason why lamps do not cause this discoloration is that they are not always in the same place, and they are as a rule of much lower power than the gas-lights ordinarily used in the same room. Gas can be burned most efficiently for heating purposes without any flame or visible combustion; in fact, flame is only a sign of incomplete or imperfect combustion, and, looking forward to a possibly near future, I believe that all fuels, both solid and gaseous, will be burned for heating purposes without any flame. I will show you how deceptive appearances are by making an enormous flame, in which I am burning, probably, at the rate of 100 cubic feet of gas per hour. This flame is a delusion; like an empty bottle, it is all outside and of very little use. Passing through the thin film of flame on the outer surface it is quite cold inside, and this I will easily prove. If it were large enough I should not have the slightest objection to walk into the middle of it and remain there; not being large enough for myself I will protect the stem of this thermometer from the outer film of flame, and put the bulb inside. It will register about 120° Fahrenheit. I will replace the thermometer-bulb by a ball of tissue-paper, and you see it is unchanged. I will protect part of my hand from the outer film of flame, and pick the paper out with my bare fingers; and, lastly, will place a small paper of gunpowder in the centre of the flame and let it remain there. Such a flame as this, notwithstanding its apparent fierceness and size, is of little use. If you place a cold vessel in it, it makes an abominable smell. It is a mixture of gas and air, but in incorrect proportions, owing to the faulty construction of the burner, and the mixture can only burn on the surface where it comes in contact with the external air. By increasing the air-supply to the correct proportion, as you see, the flame is reduced in size, becomes solid to the centre, and explodes the gunpowder. Carrying on my experiment still further, I now use a different burner of a much smaller size, and use air under pressure from a small foot-blower—as the burner I have been using would, with an air-blast, require about 1,000 cubic feet of gas per hour to work it—and I wish to show you, as near as possible, the same quantity of gas being burned under different conditions. This burner you now see is only 2¼ inches across the surface, yet, with the assistance of a small blower, it may be made to burn perfectly up to 200 cubic feet or more per hour—sufficient to make steam for a two or three horse-power engine. You can judge of the heat of the flame by the iron wire I put in it, which you see burns almost like paper. Changing the burner once again, I use a large blowpipe, which gives a most intense flame; in fact, the advantage of a blowpipe consists in its burning as much gas as possible in an exceedingly small flame of great intensity. Now, if you will watch me carefully, I will direct the flame on this ball of fine scraps of wrought iron, a metal which is practically infusible in an ordinary furnace, and without turning off the gas I will pinch the gas-supply pipe so as to extinguish the flame. The gas is still there, burning as before, but burning entirely without flame, and, as you see, the iron melts and runs like water instantly. That there is no flame I will prove to you by putting a slip of paper before the blow-

pipe, which, as you see, is not burned nor discolored; that the gas is burning and has not been interfered with I will prove by stopping the blower, and allowing the gas to burn with a flame as at first. I have now taken you from a cold flame, into the centre of which I put my fingers, to an intense heat without any flame, and, as you see, the heat increases as the flame reduces, until at its maximum the flame disappears altogether. The combustion of gases appears to be a succession of explosions, either so quick as to be silent to human ears, or so slow as to make, if continued, a musical sound. To enable you all to hear this I shall, as you will no doubt admit, pass the bounds of what may be considered classical music, but I will make these two burners speak in their own natural tones. If they are not charming as musical instruments they have the one great advantage that a little of it goes a very long way, and you will not desire that my musical performance shall be a long one. The quantity is amply compensated for by the quality, which is certainly not excelled by anything from a donkey to a fog-horn. Bear in mind that the application of gas to music is in its infancy, and there is certainly room for improvement in the future."

PUTTING ELECTRIC-WIRES UNDERGROUND.

THE following is the text of the law requiring electric-wires to be put underground in cities of more than 500,000 inhabitants in the State of New York:

An act in relation to telegraph and electric-light companies in cities of this State.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. All telegraph, telephonic, and electric-light wires and cables used in any incorporated city of this State, having a population of five hundred thousand or over, shall hereafter be placed under the surface of the streets, lanes, and avenues of said cities.

SEC. 2. Every corporation, association, or person owning or controlling telegraph, telephonic, electric, or other wires and cables, including what is known as telegraph-poles, and other appurtenances thereto, shall, before the 1st day of November, 1885, have the same removed from the surface of all streets or avenues in every such city of this State.

SEC. 3. In case the owners of the property above enumerated shall fail to comply with the provisions of this act within the time herein specified and limited, the local governments of the said cities of this State shall then, and they are hereby directed to, remove, without delay, all telegraph, electric-light, and such other wires, cables, and poles, wherever found above ground, within the corporate limits of their respective cities.

SEC. 4. No city in this State shall grant any exclusive privilege or franchise under this act to any corporation or individual by which a monopoly may be created or competition prevented on equal terms.

SEC. 5. This act shall take effect immediately.

NEW ENGLAND WATER-WORKS ASSOCIATION.

THE third annual meeting was held at Lowell, Mass., June 19 and 20. There were present the following members:

Active—Wm. R. Billings of Taunton; J. Henry Brown of Boston; Jonas M. Clark of Northampton, Mass.; Robert C. Coggeshall of New Bedford; Edwin Darling, Pawtucket, R. I.; Nathaniel Dennett, Somerville, Mass.; George A. Ellis, Springfield, Mass.; Albert S. Glover, Newton; Robert M. Gow, Medford; Sherman E. Grannis, New Haven; Frank E. Hall, Worcester; Ward W. Hawkes, Malden; Thomas A. Hodge, North Adams; Horace G. Holden, Lowell; David W. Horan, Clinton, Mass.; Horatio N. Hyde, Jr., Newton; Addison Lane, Melrose; Thomas C. Lovell, Fitchburg; Alvord O. Miles, East Providence, R. I.; Hiram Nevons, Cambridge; Albert F. Noyes, Newton; Walter H. Richards, New London, Conn.; Henry W. Rogers, Lawrence; Joseph G. Tenney, Leominster, Mass.; Charles K. Walker, Manchester, N. H.; William C. Wilcox, Waltham.

Fine—Equitable Water-Meter Co., Boston; Jason Giles, manager of Chapman Valve Manufacturing Co., Indian Orchard, Mass.; National Meter Co., New York; Union Water-Meter Co., Worcester; Wm. B. Sherman, Secretary of the Corliss Steam-Engine Co., Providence, R. I.

The following persons and firms were added to the membership:

Active—Daniel Russell, Everett; John C. Chase, Wilmington, N. C.; Gilbert Murdock, St. John, N. B.; Junius A. Brand, Norwich, Conn.; A. H. Howland, Indian Orchard, Mass.; Marshall Mason, St. Albans.

Fine—H. R. Worthington, New York; B. S. Grush, Salem; R. D. Wood & Co., Philadelphia; Marshall T. Davidson, Brooklyn.

After the election of members, the retiring President, Mr. Frank Hall, of Quincy, Mass., delivered the annual address, directing the attention of the members to the work of the society in the past year, which he thought was justly a matter of pride to them. On the question of the best time for holding the annual meeting, he hoped the association would keep the date in the month of June, and would retain the present custom of holding an informal meeting, or "field-day," in the fall. He desired the society to co-operate with the American Water-Works Association in making the annual meeting of that body in Boston next April a success, and hoped to have the influence of the New England Association extend beyond New England.

After the presentation of the Executive Committee's annual report, which showed the present membership to be fifty-seven, a gain of fourteen during the year, officers for the coming year were elected as follows: President, George A. Ellis, Springfield, Mass.; Vice-Presidents, Charles K. Walker, Manchester, N. H.; Horace G. Holden, Lowell, Mass.; Alvord O. Miles, East Providence, R. I.; Nathaniel I. Jordan, Auburn, Me.; Walter H. Richards, New London, Conn.; Secretary, Albert S. Glover, Newton; Treasurer, Edwin Darling, Pawtucket, R. I.; Executive Committee, Henry W. Rogers, Lawrence, Mass.; Sherman E. Grannis, New Haven, Conn.; and Frank E. Hall, Quincy, Mass.; Finance Committee, J. H. Hathaway, ———; Thomas C. Lovell, Fitchburg; and J. Henry Brown, Boston. Mr. Ellis accepted his election to the presidency in a brief speech. Mr. William B. Sherman, of Providence, R. I., made a suggestion which met with instant favor, that each member should prepare a sketch of some work which had come under his notice, with drawings of a common size, and present them at the next meeting. He exhibited a drawing 10"x15", to illustrate what was desired. His suggestion was adopted.

After some discussion of miscellaneous matters, the Executive Committee was authorized to make arrangements for the co-operation of the society with the American Water-Works Association at its Boston meeting.

Gate-Boxes were then briefly remarked upon by H. W. Rogers, of Lawrence, T. A. Hodge, of North Adams, and H. N. Hyde, of Newton.

After dinner at the St. Charles Hotel, in company with the Lowell Water-Board and the Committee of the City Council appointed to welcome the engineers, business was resumed, and Lucian A. Taylor and George E. Batchelder, of Worcester, and C. B. Fitz, of Attleboro, were elected to active membership. Then followed the reading of the two papers, previously announced on the programmes of the meeting, which we regret were received by us too late for more than mention of titles here. One was on "Service-Pipes, their Materials, etc.," by Mr. W. H. Richards, of New London, Conn.; the other on "Filtration of Water," by Mr. Henry W. Rogers, of Lawrence, Mass. Both papers excited much interest, and led to animated discussion. We shall advert to them in a later issue.

At the evening session Messrs. Billings and R. C. P. Coggeshall were appointed a committee to suggest a plan to the next annual meeting whereby uniformity of reports of water superintendents might be obtained. Springfield, Mass., was selected as the place for the next annual meeting. The holding of the fall meeting was referred to the Executive Committee with full power to name time and place. A vote of thanks was passed to the Lowell City Government, the Lowell Water-Board, and Superintendent Holden, of the Water-Works, for courtesies extended to the association, and also to the retiring President, Mr. F. G. Hall, for services rendered during his term of office. The business meeting was then adjourned. Friday the members saw the Fire Department of Lowell in parade, inspected the water-works, and visited other places of interest, and in the afternoon went in excursion to Tyng's Island, in the Merrimac River, returning to Lowell in time to separate to their respective cities by the afternoon trains.

REPORT ON MARITIME QUARANTINE.

At the Quarantine Conference, held at New Orleans, June 2-4, resolutions were adopted relating to quarantine matters, from which we give the following extracts:

ON INTERSTATE QUARANTINE.

Resolved, That there should be entire harmony and co-operation between the health authorities of the several States.

Resolved, Every State should appoint inspectors on all passenger trains from infected places, and on all steamboats or other river crafts on which it may be deemed advisable to have inspectors, to see that the quarantine rules are enforced in good faith.

Resolved, Every State should have the right to place inspectors of its own at points within the jurisdiction of any other State, and upon railroad trains and river boats within the limits of such jurisdiction. Inspectors coming under this head should be allowed all reasonable facilities for obtaining information and for the transmission of the same, and should comply with the quarantine regulations of the State or locality in which they are acting. On local or municipal quarantine, yellow fever or cholera having been introduced into any community, particularly into any city or town, earnest efforts should be made to confine the disease within the smallest limits—that is to say, to prevent its dissemination through the community. To this end the infected house or locality should be vigorously isolated, and disinfection should be employed according to the most improved methods.

DR. JEROME COCHRAN, Alabama.

DR. G. B. THORNTON, Tennessee.

DR. W. E. ANDERSON, Florida.

DR. R. M. SWEARINGEN, Texas.

DR. J. M. TAYLOR, Mississippi.

DR. L. F. SALOMON, Louisiana.

RESOLUTIONS ON INTERNATIONAL SANITATION.

WHEREAS, In view of the fact that the rapid and intimate intercourse which the expanding commerce of the United States has established with all foreign, and especially tropical countries, has greatly enhanced the danger arising from the importation and dissemination of infectious diseases; and

WHEREAS, It would greatly aid the vigilant and efficient health authorities of the National and State Governments if measures could be taken, with the approval and co-operation of the foreign powers having dominion over this continent, its islands, and its isthmus, as would effectually prevent the exportation and transportation of such infectious diseases from such ports and places as may be declared in quarantine by the executive authority of any State of this Union; and

WHEREAS, The constitutional authority of the National Government in foreign countries, exercised through its ministers and consuls, as well as its undoubted jurisdiction over its own vessels, or others clearing for entry in its own ports, will, with the co-operation of our domestic guardians of the public health, furnish a continuous watch over all sanitary intercourse from the point of apprehended infection to any locality within our own country; therefore,

Resolved, That our Representatives and Senators are hereby respectfully requested to introduce simultaneously into both Houses of Congress bills—

1. Extending the provisions of the act regulating the transportation of passengers and merchandise passed May 3, 1855, and the acts amendatory thereof, over all ports and places upon the continent and islands of America so far as the same may be necessary or applicable, and also over all vessels and other vehicles clearing from such ports or places for the United States while in such foreign ports or places, or while in voyage or other transit between such ports or places of foreign departure and their destination in the United States.

2. Conferring the force and sanction of law upon all sanitary ordinances issued by the Department of State, under the act of June, 1879, and especially providing that all sanitary duties imposed by law upon consuls or commercial representatives of the United States, as well as upon shipmasters and owners or conductors of such vessels, or other vehicles, shall be enforced by adequate and summary penalties, personal and pecuniary.

That the President of the United States shall be empowered and instructed to negotiate such conventions with the foreign powers hereinbefore referred to, as will effectually prevent the exportation of infectious diseases from any port or place within their dominions so declared in quarantine, to any port or place in the United States; that the same may be incorporated as a means of international sanitation in the legislative codes of all civilized nations.

Resolved, That in consideration of the universal interest which the whole people of the United States have in the preservation of the public health against the importation of

infectious diseases, an appeal is respectfully addressed to the members of both bodies of Congress, to permit the most prompt action upon the proposed measure of international sanitation, consistent with the deliberations due to a subject of such vital importance.

Resolved, That copies of the foregoing resolutions, properly attested by the President and Secretary of this Health Conference, be forwarded to the Representatives and Senators in Congress from the several States bordering on the Gulf of Mexico, and other members of Congress who may be expected to take an interest in them.

Resolved, That a committee of three be appointed by the chair to enforce these resolutions by a proper memorial to Congress.

Adopted as part of the maritime committee's report

DELEGATES TO THE NATIONAL CONVENTION OF MASTER PLUMBERS.

THE following are the delegates so far as reported by the master plumbers' associations to represent them at the convention in Baltimore, June 25:

NEW YORK.—J. A. Macdonald, James Muir, N. G. Geraty, G. D. Scott, John Mitchell, John Toumey, T. J. Byrne, Alexander Low, William Young, E. B. Cunningham, Philip Brady, William Vail, J. P. Quin, S. Clark, A. L. Whitelaw, W. I. Lightbody, Edward Murphy, John Renahan, F. T. Locke, J. O. Shumway, J. J. Sullivan.

Alternates.—H. Boyd, O. G. Fuchs, George Boyle, Alfred Ivers, John H. Graham, H. C. Gabay, W. H. Quick, T. J. Toumey, Thomas Cochrane, E. J. Conlon, E. J. Brady, Philip Smith.

PHILADELPHIA, PA.—John Eyanson, Harry Coffin, G. F. Uber, A. M. Hicks, A. G. Bond, H. J. Burke, John S. McGinley, John Adams, Enoch Remick, James H. Lyons, J. J. Weaver, W. L. Owens, W. H. Doyle, W. M. Wright, J. A. Heffron, William McCoach, W. W. Mentzinger.

BALTIMORE, MD.—J. A. Wilson, John Traynor, J. W. Bechtel, P. T. Barry, D. B. Foster, J. T. Dwyer, W. R. Brady, J. F. Duley, H. C. Bowman.

WILMINGTON, DEL.—Alfred Gawthrop, J. H. Jones.

Alternates.—J. C. Brison, Thomas Riley.

WASHINGTON, D. C.—S. S. Shedd, chairman; James Ragan, E. J. Hannan, H. C. Thorn.

Alternates.—T. V. Noonan, James Nolan, T. Fritz, James Lockhead.

BOSTON, MASS.—Isaac Riley, James F. Davlin, James Tucker, D. G. Finerty, John H. Stevens, William H. French, Henry Hussey.

Alternates.—J. F. Daly, John Crawford, C. M. Bromwich.

PROVIDENCE, R. I.—Thomas Phillips, Patrick Tierney, George R. Phillips, E. Frank Carey.

Alternates.—John Tierney, James Davis, Eugene McAuliffe, Thomas A. Marvin.

DETROIT, MICH.—T. P. Tuite, J. D. Mouat, S. W. Wayson, William B. Lockwood, William C. Wilson.

PITTSBURG, PA.—J. P. Reineke, J. R. Becker, S. H. Hare, J. G. Welden, James Anderson.

BROOKLYN, N. Y.—James Birkett, chairman; James McNulty, Bernard Reed, M. J. Lyons, George Cummings, G. B. Lewis, J. Zoll, O. D. Sawkens, Samuel Bower, J. J. Powers, Thomas Hudson, Martin Fallon.

HUDSON COUNTY, N. J.—James F. Blackshaw, Joseph Tumbusch, J. H. Kniffen, M. P. Moran, A. A. Donnelly.

ALLEGHENY COUNTY, PA.—J. K. Becker, James Anderson, John P. Reineke, Samuel W. Hare, James G. Welden, William Victory.

COLUMBUS, O.—William Halley, A. Schwag, J. Andrew. Alternates.—C. E. Klie, E. A. Futerer, George Hudson.

NEW HAVEN, CONN.—Joseph H. Buckley, William Kean.

MINNEAPOLIS, MINN.—The newly-formed association will be represented at the convention.

ROCHESTER, N. Y., has decided to send no delegates.

THE SOCIETY OF ARTS AND CAPTAIN EADS.

THE Albert Medal of the Society of Arts, instituted in 1862 as a memorial of His Royal Highness the Prince Consort, and given annually "for distinguished merit in promoting arts, manufactures or commerce," has been awarded by the Council of the Society, with the approval of His Royal Highness the Prince of Wales, the President, to Captain James Buchanan Eads, "the distinguished American engineer, whose works have been of such great service in improving the water communications of North America, and have thereby rendered valuable aid to the commerce of the world."

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JUNE 14, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.		ACUTE LUNG DISEASES.							Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.	Measles.	Puerperal Diseases.		
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	13	19.8	5	38.4	2		2		2						2	1						
Boston	Mass.	435,000	159	19.0	53	33.3	6		26	1	5	2				5	0	1	6			1		2
Lowell	Mass.	71,500	19	13.8	4	21.0	1	1	6								2							
Worcester	Mass.																							
Fall River	Mass.	67,000	13	10.1	7	53.8		1	2		1								1					
New Haven	Conn.	69,500	28	20.9	11	39.2			3		1	1	2				2							
Providence	R. I.	125,000	30	12.5	8	26.6	3	1	1		1	1	1				1	1						
Total		803,000	262	17.0	88	33.5	12	3	40	1	10	4	3			5	16	3	7			1		2
EASTERN CITIES.																								
Albany	New York	103,000	46	23.2	14	30.4	1		4	1	3			1		2	5	1				1		2
New York	New York	1,355,000	621	23.8	269	43.3	41	3	89	12	50	26	2	7	3	10	44		25		21	7		5
Brooklyn	New York	670,000	192	11.9	62	32.2	7		41	3	10	2	2	1	4	1	19		9			5		3
Hudson County	New Jersey	225,000	75	17.3	23	30.6	5	1	13	1	4	1		3		2	2					2		
Newark	New Jersey	154,000	64	21.6	26	40.6	1	1	8		8	2	2	2		2	4	2	3			1		
Philadelphia	Pa.	940,000	364	20.1	150	41.2	13		63	4	21	12	2	15	1	8	27	4	11	1	3			1
Wilmington	Delaware																							
Total		3,447,000	1,362	30.5	544	39.9	68	5	218	21	96	43	6	29	8	25	101	7	48	1	24	16		11
LAKE CITIES.																								
Buffalo	New York																							
Rochester	New York																							
Cleveland	Ohio	210,000	56	13.8	24	42.8	6		5	2	4	2		2	1		2	2	1		2	1		1
Detroit	Michigan	140,000	51	18.9	26	50.9			2	3		7				2	2	1			2			
Chicago	Illinois	650,000	214	17.1	112	52.3	13	2	20	3	8	10		4	2	11	11		11		20	4		2
Milwaukee	Wisconsin	147,000	47	16.6	25	53.1	1		10		3	3				2						1		
Total		1,147,000	368	16.7	187	50.8	20	2	37	8	15	22		6	3	15	15	3	12		24	6		3
RIVER CITIES.																								
Pittsburg	Pa.	210,000	64	15.8	31	48.4	6		4		3	8	1	1		1	3		1		2		1	
Cincinnati	Ohio	275,600	87	16.4	42	48.2	5	1	10		4	3			1	1	3	1	2			2		
Louisville	Ky.																							
Indianapolis	Ind.	94,000	17	9.4	5	29.4			2					1		1				1				
Minneapolis	Minn.	100,000	23	11.9	11	47.8			2	1		2					5		1					2
Evansville	Ind.	34,000	11	16.8	6	54.5	1	1	3		1						1							
St. Louis	Mo.				...																			
Total		713,600	202	14.7	95	47.0	12	2	21	1	8	13	1	2	1	3	12	1	4		3	2	1	2
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	41	15.9	22	53.6	2		6		10	1		1	2	1	1	1						1
"	Col.	69,300	40	30.0	21	52.5			10		8			1		3	1							
Richmond	Va.	41,000	25	31.7	7	28.0	1		2		1			4		1								
"	Col.	32,400	28	45.0	16	57.1			5		2			1	1		2					1		
Charleston	S. C.	25,000	8	16.6	1	12.5			3															
"	Col.	27,800	32	59.9	10	51.2	1		4		4			1	2			1	1					
Atlanta	Geo.	30,000	18	18.8	5	62.5			1		3													
"	Col.	20,000	15	39.0	4	26.0			4		4			1			1				2			
Augusta	Geo.	20,000	10	26.0	5	50.0			4		4			1	1		1							
"	Col.	15,000	17	59.0	7	41.1			4		4				3		3							1
Nashville	Tenn.	35,100	10	14.8	4	40.0			2		2													
"	Col.	21,300	11	26.9	4	36.8			1	1		1												
Memphis	Tenn.																							
"	Wh.																							
New Orleans	La.	171,000	100	38.2	45	41.2	5		10		31	2	1	1	2		3		2		3			1
"	Col.	68,000	69	57.0	30	43.4	1		6		10			1	7		3		1		2	1		2
Total White		455,000	211	21.1	89	42.1	8		24		51	3	1	8	5	3	10	1	2		3			2
Total Colored		248,800	212	44.3	92	48.3	2	1	30		33			5	13	3	5	1	2		4	2	1	3
Total in 28 U. S. Cities		6,815,300	2,617	20.0	1,095	41.8	122	13	370	31	213	85	11	50	30	52	159	16	75	1	58	27	9	23
Summary of Mortality in Foreign Cities.																								
May 31.	Total in 28 English Cities	8,762,354	3,354	20.0			139				44	27		39		65					150		42	133
" 31.	" 8 Scottish Cities	1,254,627	547	22.7			20				16	12		9		8								
" 31.	" 16 Irish Cities	858,666	390	28.6			5		65		8	2		2		14		90	14					32
" 31.	" 138 German Cities	8,370,900	4,465	26.2	1,992		119		799		222	140		41		63		77	1					8
" 10.	" 15 Swiss Cities	455,537	198	22.6			5		29		17	7		13		3		16						52
" 24.	" 15 Swiss Cities	455,537	175	20.0			6		27		11	4		16				18						1

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C. Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied. The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending June 14, 1884, in 28 cities of the United States, having an aggregate population of 6,815,300, there were 2,617 deaths, which is equivalent to an annual death-rate of 20.0 per 1,000. In the North Atlantic cities the rate was 17.0; in the Eastern, 20.5; in the Lake, 16.7; in the River, 14.7; and in the Southern cities for the whites 24.1, and for the colored 44.3 per 1,000. Of all deaths 41.8 per cent. were under 5 years, the proportion being highest in the Lake cities—viz., 50.8 per cent.

Accidents caused 4.6 per cent., consumption 14.1, croup 1.1, diarrhoea 8.1, diphtheria 3.2, typhoid fever 1.9, malarial fever 1.1, scarlet fever 1.9, pneumonia 6.1, bronchitis 2.8, measles 2.2, puerperal diseases 1.0, small-pox 0.3, and whooping-cough 0.8 per cent. of all deaths. Diarrhoeal diseases caused 7.0 per cent. of all deaths in the Eastern cities; 24.1 per cent. among the whites in the Southern cities, and 15.5 among the colored; diphtheria 6.4 per cent. in the River cities; and measles 6.5 in the Lake cities. Deaths from small-pox were reported in Pittsburg, Nashville, and New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports for the week 37 new cases of scarlet fever, 20 of diphtheria, and 7 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 12 new cases of scarlet fever and 28 of diphtheria.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 7 cases of diphtheria and 24 of scarlet fever under treatment June 14.

BALTIMORE, MD.—The Health Officer's report registers 131 deaths for the week, including 60 under 5 years of age. The annual death-rate for the whole population was 16.65 per 1,000, or 14.30 for the whites and 30.33 for the colored. Scarlet fever caused 2 deaths, croup 2, measles 3, whooping-cough 3, typhoid fever 3, malarial fever 1, diarrhoeal diseases 13, consumption 16, acute lung diseases 7, and violence 6.

RICHLAND, VA.—During the month of May there were 172 deaths, of which 35 were under 5 years of age. The annual death-rate for the whole population was 28.12; for the whites, 25.29, and for the colored, 32.96. The rate for this month is higher than for any corresponding month for the past 4 years. Measles caused 2 deaths, whooping-cough 2, cerebro-spinal fever 2, typhoid fever 22, malarial fevers 12, diarrhoeal diseases 7, acute lung diseases 10, consumption 19, and violence 8.

PROVIDENCE, R. I.—Dr. E. M. Snow in his report for May records 185 deaths, which is equivalent to an annual death-rate of 18.50; this rate is higher than that of any of the 4 preceding months this year, and is 2.46 below that of the corresponding month last year. Of the decedents only 38, or 20.5 per cent., were under 5 years of age. Diphtheria caused 4 deaths, scarlet fever 6, measles and whooping-cough each 1, typhoid fever 4, diarrhoeal diseases 2, consumption 40, acute lung diseases 25, and violence 11.

CHICAGO, ILL.—During the month of May there were 1,036 deaths, which is equivalent to an annual death-rate of 2

diarrhoeal diseases 7, consumption 16, bronchitis 5, and violence 4.

BELGIUM—Brussels.—Week ending May 24: Deaths, 107; annual death-rate, 20.3. Small-pox caused 9 deaths, typhoid fever 3, diphtheria 1, croup 3, whooping-cough 3, diarrhoeal diseases 11, bronchitis and pneumonia 30, consumption 33, and violence 7.

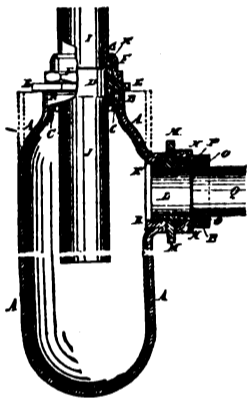
RUSSIA—St. Petersburg.—Week ending May 17: Deaths, 656; annual death-rate, 36.8. Small-pox caused 4 deaths, measles 41, scarlet fever 6, typhoid fever 26, diphtheria 25, whooping-cough 4, diarrhoeal diseases 83, and acute lung diseases 86.

DENMARK—Copenhagen.—Week ending May 27: Deaths, 118; annual death-rate, 22.0. Diphtheria and croup caused 4 deaths, whooping-cough 3, diarrhoeal diseases 6, consumption 12, acute lung diseases 11, and violence 5.

American Patents.

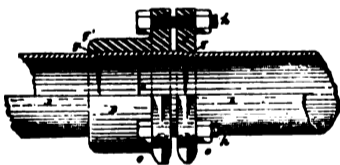
It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.
Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

294,489. REMOVABLE BOTTLE-TRAP. GEO. H. McCLOSKEY, Brooklyn, N. Y. Filed May 12, 1883. (No model.) Issued March 4, 1884.



Claim.—In a removable bottle-trap, the combination, with a cylindrical cup having its mouth spun into a neck which is provided with a female-screw tube, of the tubular male-screw having an external circumferential flange, and coupling-ring to receive the inlet-pipe, substantially as and for the purpose set forth.

294,562. PIPE AND OTHER JOINTS. JAMES A. BALDWIN, JR., East Jaffrey, N. H. Filed September 14, 1883. (No model.) Issued March 4, 1884.

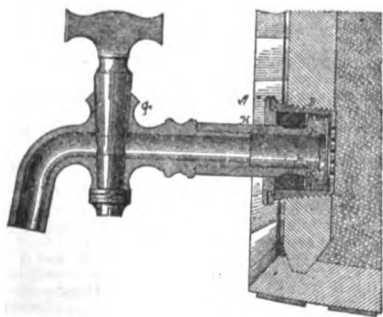


Claim.—1. The packing-ring having a plain surface on one side, and an annular groove in its opposite side, substantially as and for the purpose set forth.

2. The packing consisting of the ring with a plain surface on one side, and an annular groove in its opposite side, the plain-surfaced side of said ring being inserted into a groove of one part of the joint, and the projecting grooved side of said ring bearing against the face of the opposite part of said joint, substantially as and for the purpose set forth.

3. In pipe-joints, the combination of the internally-screw-threaded flanges C D, the bolts E, uniting said flanges, the externally-screw-threaded pipes A B, and the copper-ring R, having in its projecting face an annular groove, and partially countersunk within the face of one of the said flanges, substantially as specified.

294,610. COMBINED FAUCET AND TAP-VALVE. KING C. GILLETTE, New York, N. Y., assignor to Joseph L. Spofford, same place. Filed September 13, 1883. (No model.) Issued March 4, 1884.



Claim.—1. The combination, with a faucet having notches in its end, of a cup or shell with a perforated bottom, a valve with inclined ways engaging with guides in the interior of the cup or shell, and provided with lugs for engaging with the notches in the faucet, and

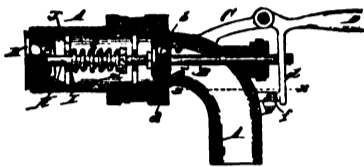
an elastic ring or washer confined within the cup and adapted to be compressed around the faucet by the forward movement of the valve, substantially as set forth.

2. A tap-valve consisting of a threaded cup with perforated bottom, a removable annular face-plate and elastic ring or washer, and a screw-threaded valve provided with lugs or ears, in combination with a faucet of a conformation to be inserted through the face-plate and elastic ring, and having notches in its end for engaging with the lugs or ears on the valve, whereby the latter may be turned and raised, substantially as set forth.

3. The combination, with a cup or shell having a perforated bottom, of the removable annular plate C, the elastic ring F, washer E, screw-threaded valve D, having lugs G, and a faucet provided with notches or slots for engaging with and operating the valve in the manner set forth.

4. The combination, with the shell or cup B, having a perforated bottom, of an annular face-plate, C, an elastic ring or washer confined thereby, a plate or valve having lugs G, and inclined flanges or threads engaging with guides in the cup, and a faucet having a cylindrical shank provided with a groove, H, and slots K K, all substantially as herein described.

294,674. WATER AND STEAM COCK OR FAUCET. JOSEPH RICHTER, Cincinnati, O. Filed February 15, 1883. (No model.) Issued March 4, 1884.



Claim.—1. In a faucet, the combination of the sections A A', the valve-rod B, the ogee-valve C, seated on the section A, means for operating the said valve-rod and locking it in its adjusted position, the guides I, having the radial arms J, the valve-rod N, loosely passing through the guides, and having the valve K, seated on the section A', and the spring O, arranged between the guides, substantially as described.

2. The combination, with the two-part barrel A A', valve-rod B, stop E, and lever D, of the auxiliary valve K, its rod N, the guide I, having arms J, the spring O, and the nut M, all arranged and operating substantially as described.

293,444. STEAM-BOILER CLEANER. JAMES HARVEY FOSTER, Era, Tex. Filed June 27, 1883. (No model.) Issued February 12, 1884.

293,458. HOSE-COUPLING. SAMUEL HAMER, Salt Lake City, Utah. Filed September 27, 1883. (No model.) Issued February 12, 1884.

293,461. PUMP. NATHAN HEMENWAY, Napa City, Cal. Filed October 8, 1881. (No model.) Issued February 12, 1884.

293,480. PIPE-MOLDING PIT. DENNIS M. LONG and JOHN KILLER, Louisville, Ky. Filed November 30, 1883. (No model.) Issued February 12, 1884.

293,503. WATER-GATE. FLOYD OGDEN, Fisherville, Ky. Filed April 6, 1883. (No model.) Issued February 12, 1884.

293,519. FILTER-CASE. EDWIN S. RICH, Jersey City, N. J. Filed September 26, 1883. (No model.) Issued February 12, 1884.

293,528. FIRE-PROOF BUILDING. JOHN J. SCHILLINGER, New York, N. Y. Filed October 10, 1883. (No model.) Issued February 12, 1884.

293,524. BUILDING-BLOCK. JOHN J. SCHILLINGER, New York, N. Y. Filed November 15, 1883. (No model.) Issued February 12, 1884.

293,526. CHIMNEY-CAP. MICHAEL SCHOLL, San Francisco, Cal. Filed May 31, 1883. (No model.) Issued February 12, 1884.

293,587. FEED-WATER PURIFIER. WILLIAM K. STEVENS, Mansfield, Ohio. Filed August 3, 1883. (No model.) Issued February 12, 1884.

293,548. DAMPER. ROBERT L. WALKER, Boston, Mass., assignor to the Walker Smokeless Furnace Company, same place. Filed May 23, 1883. (No model.) Issued February 12, 1884.

293,544. STEAM-BOILER FIRE-BOX. ROBERT L. WALKER, Boston, Mass., assignor to the Walker Smokeless Furnace Company, same place. Filed May 23, 1883. Issued February 12, 1884.

293,558. COMBINED GAS AND ELECTRIC-LAMP FIXTURE. SIGMUND BERGMANN, New York, N. Y., assignor to Bergmann & Co., same place. Filed October 9, 1882. (No model.) Issued February 12, 1884.

293,560. HYDROCARBON-FURNACE. WILLIAM H. BROOKS, New York, N. Y. Filed October 22, 1883. (No model.) Issued February 12, 1884.

293,562. COMBINED WATER-FILTER AND COOLER. FRANK E. CADY, Auburn, N. Y. Filed June 25, 1883. (No model.) Issued February 12, 1884.

293,578. CAR-VENTILATOR. OWEN H. JONES, Hartford, Conn., assignor to one-half to Frank C. Smith, New York, N. Y. Filed February 15, 1883. (No model.) Issued February 12, 1884.

293,585. OSCILLATING STEAM PUMPING-ENGINE. FRANK D. MALTSY, New York, N. Y. Filed May 19, 1883. (No model.) Issued February 12, 1884.

294,078. CONSTRUCTION AND OPERATION OF CAISSONS. JOHN E. ROBINSON, Baltimore, Md. Filed July 21, 1883. (No model.) Issued February 26, 1884.

294,080. MANUFACTURE OF CEMENT. LUDWIG ROTH, Wetzlar, Prussia, Germany. Filed October 1, 1883. (No specimens.) Issued February 26, 1884.

Claim.—The method of making cement by burning and pulverizing a mixture of blast-furnace cinder, carbonate of lime, and an alkaline chloride, substantially as herein specified.

294,085. HYDRAULIC RAMS ARRANGED IN SERIES. LOUIS SCHUTTE, Philadelphia, Pa. Filed January 24, 1883. (No model.) Issued February 26, 1884.

294,092. MACHINE FOR CUTTING SCREW-THREADS. ELMER A. SPERRY, Cortland, N. Y., assignor to Jesse Van Denburgh, same place. Filed September 30, 1882. (No model.) Issued February 26, 1884.

294,098. ICE-MACHINE. GEORGE TAYLOR, Everett, Mass. Filed September 8, 1883. (No model.) Issued February 26, 1884.

294,104. TAP AND REAMER-WRENCH. HARRY F. WOODS, West Somerville, Mass. Filed May 24, 1883. (Model.) Issued February 26, 1884.

294,109. FIRE-ESCAPE. FRANK A. BONE, Lebanon, Ohio. Filed May 3, 1883. (No model.) Issued February 26, 1884.

294,118. MEANS FOR PRODUCING CIRCULATION IN STEAM-BOILERS. WM. CRAIG, Brooklyn, N. Y. Filed December 14, 1883. (No model.) Issued February 26, 1884.

294,119. STEAM-GENERATING APPARATUS. JOHN H. DALE, Philadelphia, Pa., assignor to two-thirds to Abraham S. Jenks, same place. Filed March 16, 1882. (No model.) Issued February 26, 1884.

294,138. WATER-FILTER. JOHN JOHNSON, Brooklyn, N. Y. Filed August 6, 1883. (No model.) Issued February 26, 1884.

294,134. OIL-CUP. HENRY L. JOHNSTON, Palmetto, Ga. Filed January 16, 1884. (No model.) Issued February 26, 1884.

294,137. BENCH-VISE. MORTIMER G. LEWIS, Lowell, N. Y. Filed July 16, 1883. (No model.) Issued February 26, 1884.

294,143. SCREW STOCK AND DIE. WILLIAM J. MCCORMACK, Paignton, County of Devon, England. Filed July 16, 1883. (No model.) Patented in France May 26, 1883, No. 155,707; in England, May 20, 1883, No. 2,665; in Germany May 30, 1883, and in Belgium May 30, 1883, No. 61,540. Issued February 26, 1884.

294,160. METALLIC STEAM-PIPE CONNECTION. JOHN M. SWEENEY, Wheeling, W. Va. Filed November 21, 1882. Renewed October 5, 1883. (No model.) Issued February 26, 1884.

294,167. SEAM FOR SHEET-METAL VESSELS. FRANCIS A. WALSH, Chicago, Ill. Filed July 2, 1883. (No model.) Issued February 26, 1884.

294,179. DEVICE FOR WELDING BOILERS, ETC. STEPHEN ALLEY, Glasgow, County of Lanark, Scotland. Filed October 2, 1883. (No model.) Patented in England January 5, 1883, No. 69. Issued February 26, 1884.

294,201. APPARATUS FOR INDICATING TEMPERATURES OF DISTANT ROOMS. WILLIAM R. COMINGS, Norwalk, Ohio. Filed August 27, 1883. (No model.) Issued February 26, 1884.

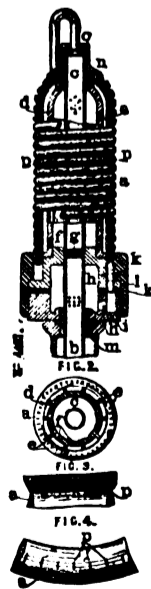
294,209. REFRIGERATING APPARATUS FOR CARS, &c. WILLIAM H. DOUGHTY, New York, N. Y. Filed October 22, 1883. (No model.) Issued February 26, 1884.

294,210. PUMP. JOSEPH W. DOUGLAS, Middletown, Conn., assignor to himself and W. & B. Douglas, same place. Filed April 6, 1883. (No model.) Issued February 26, 1884.

294,215. PORTABLE RESERVOIR FOR STOVES. HARVEY L. FISHER and ANGELL J. HASSELL, Toledo, Ia. Filed January 19, 1883. (No model.) Issued February 26, 1884.

English Patents.

4,467. IMPROVEMENTS IN GAS-BURNERS FOR LIGHTING AND HEATING PURPOSES.



The invention relates to improvements in burners for lighting and heating and has for its object to heat the current of gas before its combustion and thereby improve its illuminating and heating power.

ALMON HENRY HEARINGTON, of 51 Regents Park Road, in the county of Middlesex. Complete Spec. March 6, 1884.

Association News.

CHICAGO MASTER PLUMBERS.—The association met June 19 in its rooms, President A. Young in the chair. Satisfactory transportation arrangements for the Baltimore delegates were reported. A paper was read by Thomas Hovey, winding up with the following resolutions, which were unanimously adopted: "That we, the Master Plumbers' Association of Chicago, are opposed to trading with or buying from manufacturers of gas-fixtures who sell to consumers; that delegates from this association to the National Convention at Baltimore be instructed to have said convention adopt such measures as will be in harmony with the foregoing resolution and thereby assist in the breaking up of a system that is fraught with so much injury to us." This was the keynote of a paper by J. J. Wade, which was also unanimously indorsed. Both papers, as also all other papers assigned to Chicagoans to be read at the National Convention, were ordered printed for distribution at Baltimore, and it is evident that lively times may be expected at that gathering. The Chicago delegation was empowered to cast a full vote, even though there should be vacancies. A. W. Murray read a well-received paper, also prepared for Baltimore and hence unreportable at this time, on the Sanitation of Cities. A communication from the journeymen, who proposed discriminations against non-union men, was laid on the table, and the association went into private session. The delegates started East, June 22, in a body.

PHILADELPHIA MASTER PLUMBERS.—The delegation of Philadelphia plumbers to the National Convention at Baltimore met on Thursday evening, June 19, to complete arrangements. They determined to take the 7.20 A. M. train from Broad Street station on Wednesday, arriving in Baltimore at 9.45, which gave them one-quarter of an hour to reach the convention hall. They go all together, and stop at the Utah House during their stay.

BALTIMORE, MD., MASTER PLUMBERS.—The last two meetings of the Master Plumbers' Association were held on June 5 and 19, at Knapp's Hall, Holliday Street. The attention of the members was occupied in discussing matters preparatory to the meeting of the National Convention. At the meeting held on the 19th, Mr. James Millar, Jr., who has held the office of Recording Secretary since the formation of the association, resigned that office. That the association has lost a good and efficient officer by Mr. Millar's action there can be no doubt. The chairman of two of the principal committees also resigned, but have since withdrawn their resignations at the earnest request of the members.

MARYLAND STATE SANITARY ASSOCIATION.—Baltimore, June 21.—On the 16th there was a preliminary meeting here for the purpose of forming a State Sanitary Association. The following gentlemen were present: Dr. C. W. Chancellor, Secretary of the State Board of Health; Dr. James A. Steuart, Health Commissioner of Baltimore; Messrs. Wm. Dunnett, William H. Rothrock, James A. Thornton, James A. Millar, Jr., George Knipp, John Dulany, John F. McConnell, and others. On motion of Dr. Chancellor, William Dunnett was elected Chairman, and William Rothrock, Secretary. Dr. Chancellor read a prospectus of the objects of the association, which on motion of Dr. Steuart was unanimously adopted. A committee was appointed to perfect the organization, and report at a future meeting, to be held subject to the call of the chairman. The meeting was very enthusiastic, and all present will use their best efforts to make the movement a successful one. In Maryland, as in other States, our legislators are slow to give the health authorities the legal power to abate nuisances, and thereby check the spread of contagious diseases. Our late Governor, in his annual message stated that he did not think it advisable to spend or to appropriate any money for the prevention of disease in the human animal, but did recommend the appropriation of thousands of dollars to prevent the spread of pleuro-pneumonia among the brute animals. The objects of the association are:

1. The promotion of sanitary education, and the diffusion of sanitary knowledge throughout the State.
2. To obtain proper legislation on all health matters, so as to enable more effectual steps to be taken by health authorities, to avoid the causes and check the spread of infectious and contagious diseases.
3. Co-operation with the State and local boards of health, in order to assist them in all matters relating to the public health, and to

bring to their notice all diseases and nuisances of a dangerous character, so that prompt and effectual steps may be taken to suppress them.

4. The discussion and publication of facts relating to sewerage, drainage, plumbing, ventilation, etc.

Notes.

CONSTRUCTION.

PENNINGTON & BRIAN is a firm of plumbers just started at Windsor, Ontario.

CHICAGO.—The two new pumps at the West Side Pumping Works were started June 22, and have a capacity of 30,000,000 gallons a day.

Bids have been opened for the Twelfth Street viaduct superstructure, the lowest being that of M. P. Garrity, \$13,101.

ADRIAN, MICH.—The new Court-House, E. O. Fallis & Co., of Toledo, architects, will cost, when completed, \$55,000. The contract for the superstructure has been let to Allen & Van Tassel, of Ionia, contractors. The building will be of pressed-brick, with stone basement.

IONIA, MICH.—The Court-House, for which plans were made by Architect Gibbs, of Toledo, O., is now in process of construction. The contract has been let to C. Allen, the builder and contractor. S. O. Keep, of Grand Rapids, has the contract for galvanized-iron cornices, etc. Berea stone is being used for the foundation and sandstone above.

PHILADELPHIA, PA.—The Water Department is on the lookout for a suitable place for a new reservoir to supply Manayunk and the Falls of Schuylkill with water. These places are now supplied from the Roxborough basin. Bids were opened at the Fire Department for furnishing 15,000 feet of rubber-lined hose, and the successful bidders were Robert Levick's Son & Co., who proposed to furnish the quality known as the Eureka brand, which is mainly now in use in the department, at 83 cents per foot. There were seven other bids received, whose prices ranged from 79½ cents per foot for Boston-wove hose, by William Heaton, Jr., to 90 cents per foot for the hose made by the American Manufacturing Company, of Chelsea, Mass. Campbell & Rickards received the contract for two new steam fire-engines at \$3,800 each, and Ambrose Gilman was awarded that for two new boilers at \$498 and \$495, respectively.

TALLADEGA, ALA., is figuring on the cost of obtaining a system of water-works.

CHICAGO, ILL.—Contracts are just let to some twelve local firms for sewers costing \$254,000, and street-paving costing \$449,175. Work begins at once, and will be done by October next. The principal street-paving contractors are: A. J. McBean & Co., Olaf Vider, J. V. McAdams & Co., R. F. Wilson, J. B. Smith & Co., Andrew Jaick, James A. Sackley, R. F. Conway. The largest sewer builders are Smith & McGuish, S. Hallinan, John Lyons.

PHILADELPHIA, PA.—The poor guardians have awarded the contract for the English Portland cement required for the next year to Chipman & Nice, at \$3.25 per barrel, and the same firm the supplying of plaster at \$1.70 per barrel. J. R. Clausen & Son was awarded the contract for terra-cotta drain-pipe, their bids being 4-inch at 7 cents per foot, 6-inch at 10 cents, 8-inch at 15½ cents, 10-inch at 24 cents, and 15-inch at 28 cents per foot. The contract for plumbers' and machinists' material required was divided between the following firms: A. W. Allen, Hunter & Dickson, H. E. Mullican, and Whetstone & Co. Matthew Hall & Co. secured the white lead at 5¼ cents per pound.

ST. LOUIS, MO.—The Terra-Cotta Company of Indianapolis has secured the contract for the materials for the Exposition and Music Hall building; also for the St. Paul, Minn., Chamber of Commerce.

TORONTO, CAN.—(Special Correspondence.) The question of increased pumping power has been under the consideration of the Council for several months. Tenders were called for at the end of last year, which were submitted to experts, who, however, disagreed in unanimously recommending one engine, which has caused the Council a great deal of difficulty in awarding the contract. The question has been the prominent one of the past fortnight, and last week led to an all-night sitting of the Council. There may be said to be three parties, one for a home-made engine, one for the

Holly engine, of Lockport, N. Y., and the third, a compromising party, who want water brought from Lake Simcoe, a distance of sixty miles from the city. This would give a head of over 300 feet for gravitation, and entail costly works of construction. Independently of the question of the merits of the relative engines, a much more useful and practical question lies unnoticed in our midst—the waste of water. The water-taking population is certainly not 50,000. At the liberal allowance of fifty gallons a day, this represents 2,500,000; allow for the various breweries, public works, elevators in offices, and the railway round-houses' services another 2,500,000, we have 5,000,000, or fifty gallons per head on an estimated population of 100,000. What is our daily consumption? 10,000,000 gallons! We can write with experience when we say that we have never seen such reckless waste of water in any city as in this. Bad plumbing-work and want of examination, and proper supervision on the part of the Water-Works Department of fixtures in houses, are responsible for it all. If systematic and well-organized inspection from house to house were made, savings would be effected in three months which would bring the demand within the powers of supply of the present engines, increase the hydrant power, and save the pockets of ratepayers to a surprising extent.

NEW LOTS, L. I., has just completed its system of water-works, which was inspected by the Supervisors, Highway Commissioners, and Chief of the Fire Department June 17. The works are owned by the Long Island Water-Supply Company.

EAST ORANGE, N. J.—A conference was held on the 13th inst. between the Township Committee and the Township Improvement Society with regard to a sewerage system for the township. The Township Improvement Society presented a report embodying the report of J. J. R. Croes, C. E., made to the society in September last, with plans and estimates of cost of a complete system of sewerage and sewage disposal for the town. A committee consisting of Messrs. Dodd, Doremus, Jones, and Woodruff was appointed to continue the investigation of the subject in behalf of the town.

NEWARK, N. J.—The Aqueduct Board has opened bids for four steel boilers for the Belleville pumping-station, as follows: McWilliams & Brown, of Jersey City, \$5,000; Hewes & Phillips' Iron-Works, \$5,180; L. J. Lym & Co., \$5,480; Variety Iron-Works, of Cleveland, O., \$4,600. The contract was awarded to the Variety Iron-Works.

ST. PAUL, MINN.—Proposals will be received at the office of the City Engineer until July 8, for the construction of six iron spans and other work, in connection with the rebuilding of the Wabashaw Street bridge. Address W. A. Somers, City Engineer.

GOVERNMENT WORK.

CUSTOM-HOUSE AND POST-OFFICE, ALBANY, N. Y.—Synopsis of bids for sidewalks for approaches, opened June 10: Hewitt Boyce, blue-stone flag, \$5,827.40, toiled; \$7,284.34, planed; Flagler & Brate, \$5,840; H. Finkel & Co., \$8,197; Bigelow, Blustom & Co., \$7,000, No. 1; \$6,300, No. 2; Francis G. Clark, \$4,600; James W. Eaton & Co., \$5,085; Flintolitic Stone & Manufacturing Co. (Asher, Meyer & Co., N. Y.), artificial stone, \$1,935; Matt. Taylor, N. Y., \$3,250; Henry J. McLaughlin, \$2,500.

POST-OFFICE AND COURT-HOUSE, QUINCY, ILL.—Synopsis of bids for iron columns, beams, etc., opened June 10: Morris Marshall, \$6,497.78; Aetna Iron Works, Quincy, Ill., \$6,885; Smith, Hill & Co., \$9,945; Haugh, Ketcham & Co., \$6,878.14; Snead & Co., \$6,595; Thomas H. Brooks, \$6,962.35; Phoenix Iron Co., Trenton, N. J., \$6,575.

POST-OFFICE AND COURT-HOUSE, SYRACUSE, N. Y.—Synopsis of bids for stonework for superstructure, opened June 11: M. A. McGowan, buff Ohio, \$57,100; buff Ohio and Conn. brown, \$65,000; W. D. Collingwood, Amherst buff, \$55,553; W. R. & W. Haven, Amherst buff, \$50,839; Peter Pitkin, Amherst buff, \$75,000; Fordyce & Hempler, Ky. limestone, \$107,000; Hughes Bros., Onondaga limestone, \$59,470; John Moore & Co., Onondaga limestone, \$65,000; Amherst buff, \$60,000; William Crabtree, not stated, \$58,000.

POST-OFFICE AND COURT-HOUSE, SYRACUSE, N. Y.—Synopsis of bids for brickwork of superstructure, opened June 11: W. R. & W. Haven, \$10,970; Dickson & Merrick, \$18,750; John Moore & Co., \$26,000.

POST-OFFICE AND COURT-HOUSE, MONTGOMERY, ALA.—Synopsis of bids for marble floor-tiling, marble mantles, etc., opened June 18: Emil Fritsch, \$3,357; Pickel Stone and Manufacturing Co., \$3,109.50; Burlington Manufacturing Co., \$3,100; Sherman & Flavin, \$2,948; Davidson & Sons, \$2,650; D. A. Curbow, \$3,900; G. & R. L. Barney, \$3,125.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
June 21.....	24.85	18.21	23.06	29.28	27.60	18.79

E. G. LOVE, Ph.D., Gas Examiner.

FON DU LAC, Wis., has gotten through with the litigation over the electric-light towers and has put in a new style Brush thirty-light plant.

THE English Government has detailed Lieutenant Chisholm Butten, of H. M. S. Northampton, to attend the International Electrical Exhibition at Philadelphia in September next.

ABOUT \$10,000 has been invested in electric-light improvements at La Crosse, Wis., in the past two months. A plant of incandescent-lights and storage-batteries is now being put in for the Inter-Ocean Hotel and for private residences.

MR. L. T. WRIGHT has been making some experiments which have led him to the conclusion that from 45 to 68 per cent. of the luminosity of a common coal-gas is due to hydrocarbons absorbed by fuming sulphuric-acid, and that illuminating paraffins also exist in the gas to which the illuminating power is in part due.

A REPRESENTATIVE of the firm of A. Santa Maria & Cie, of Paysander, Uruguay, South America, has visited this country for the purchase of gas apparatus for heating and soldering purposes, and for lighting their new factory at Paysander. They have ordered a 250-light improved portable gas-works from the Excelsior Gas-Light and Manufacturing Company.

AN associated press dispatch from Pittsburg, Pa., June 22, states that investigation has shown that a violent explosion in Carnegie Brothers' stables in that city a short time since was due to natural-gas. This had escaped from a leak in a pipe near by and passed through the ground to the stable, where it exploded when a hostler entered the stable with a lighted candle.

THE "Germanic," of the White Star Line, has been fitted up with Swan electric-lamps. The total number employed in the interior illumination of the ship is 396; there are also two clusters of eight 40 candle-power lamps for cargo purposes, and the port and starboard signal lamps are each fitted with 100 candle-power Swan lamps. The machines used are two Siemens S Doo self-regulating dynamos each capable of supporting 300 lamps. Each machine is driven by a Tangye 12 horse-power vertical engine with Raworth's cotton-rope transmission. In the principal entrance there are six silver-plated single-light brackets disposed around the sides, and a central three-light pendant under the skylight.

It has been settled that the Brush Electric-Light Company is to light the city of Detroit, Mich., by means of the tower system, the Board of Aldermen and Board of Councilmen having voted to award the contract notwithstanding the objections of the Mayor. The contract price is \$95,000, and seventy-two towers will be erected. But it is understood that if that number is not sufficient that more towers will be erected. When the matter came up in the Board of Councilmen a member who was opposed to entering into the contract charged that he had been offered \$1,000 to give the measure his support. The contract has been duly executed and the Brush Company has given a bond in the sum of \$100,000 to perform its part of the agreement. It is understood, however, that the Excelsior Electric-Light Company will apply for an injunction to restrain the city from carrying out the contract on the ground that it was not awarded to the lowest bidder in response to specific proposals for lighting the entire city. The Excelsior Company claims that if it had been allowed to bid it would have offered to light the city for not more than \$80,000.

NEW CATALOGUES.

THE New York Central Iron Works, of Geneva, N. Y., has issued a handsome lithographic card, illustrating the "Dunning Patent Boiler."

WE have received Division C of the Milwaukee Electric Manufacturing Company's illustrated catalogue, which refers particularly to Johnson's Electric-Valve.

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; b s dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK.

Ann st, n w cor William st, 6-story br st; cost, \$50,000; o, Wm. N. Gleason, Newark, N. J., and Mrs. H. Schuelting, Passaic, N. J.; a, Schwaizmann & Buchmann.

219-221 Delancey st, 2 5-story br ten; cost, \$12,000; o, Frank Schaeffer; a, Julius Boeckell.

141 Reade st, 5-story br st; cost, \$14,000; o, Rufus L. Cole; b, F. & W. E. Bloodgood and H. M. Smith & Son.

16th st, 355 e of Av C, 2-story br disinfecting house; cost, \$12,000; o, Board of Health, City of New York; a, Chas. C. Haight; b, Wm. G. Crop.

417 W 33d st, 5-story br ten; o, Patrick Donohue; a, N. Le Brun & Son; b, B. Sheridan and J. Murphy.

50th st, n s, 175 e 11th av, 2 5-story br ten; cost, ea \$14,500; o, Rosanna Kavanagh; a, M. L. Ungrich; b, day's work.

651 1st av, 5-story br and st ten; cost, \$15,000; o, Christopher Koster; a, J. Kyle.

81st st, n s, 150 e 2d av, 2 5-story b s ten; cost, ea \$14,000; o, Alphonso Beaudet; a, A. B. Ogden & Son.

3d av, w s, 100 s 98th st, 5-story br ten; cost, \$25,000; o, Ferdinand Boehm; a, John C. Burne.

85th st, n s, 119 e Av A, 2 5-story br and b s ten; cost, \$25,000; o, Emeline and Elizabeth Johnston; a, A. B. Ogden & Son.

60th st, n s, 95 e 2d av, 5-story br ten; cost, \$28,000; o, Max Danziger; a, J. C. Burne.

8th av, w s, bet 72d and 73d sts, rear, br boiler vault; cost, \$15,000; o, A. C. Clark; b, John Banta.

81st st, n s, 133.11 w 9th av, 5 4-story b s front dwells; cost, ea, \$15,000; o, Samuel Colcord; a, H. L. Harris; b, not selected.

61st st, s s, 80 w 10th av, 5-story b s st and ten; cost, \$16,000; o, John Richards; a, M. L. Ungrich; b, day's work.

83d st, n s, 125 e 9th av, 3 4-story b s dwells; cost, ea, \$12,000; o, John Jardine; a, D. & J. Jardine.

124th st, n s, 200 e 8th av, 2 5-story br tens; cost, ea, \$13,000; o, Sarah Darragh; a, J. F. Burrows.

8th av, n e cor 122d st, 4 4-story br tens; cost, ea, \$11,000; o, Lorenz Weiher, New Rochelle; a, J. F. Burrows.

ALTERATIONS, NEW YORK.

Fordham av, e s, bet Irving and Taylor sts, 2-story and mansard br extn; cost, \$35,000; o, Home for Incurables, H. T. Spaulding, trustee, 625 5th av; a, John Rogers; b, Edward Gustavson.

526 and 528 W. 34th st, raise three stories; cost, \$10,000; o, Wm. Wallace, exr.

204 E 18th st, 4-story br extn; cost, \$12,000; o, Richard Rauff; a, Wm. Schickel.

7 W. 36th st, br extn; cost, \$5,000; o, Catharine T. Schieffelin; a, J. Rogers; b, E. Gustavson.

20 Washington st, repair damage by fire; cost, \$6,000; o, Cornelia L. Heckscher; b, E. Smith & Co.

6 W. 57th st, interior alterations, plumbing changed; cost, day's work; o, John S. Kennedy; a, R. H. Robertson; b, F. Kiernan and W. H. Kirk.

BROOKLYN.

Ewen st, s e cor Stagg st, rear front on Stagg st, 2 4-story br tens; cost, ea, \$13,000; o, Mrs. S. M. Travis; a, Geo. P. Chappell; b, W. J. Conway.

17th st, n s, 150 e 8th av, 2 3-story br tens; cost, ea, \$5,000; o, I. H. Herbert.

Van Brunt st, s w cor William st, 3 4-story br dwells; cost for all, \$25,000; o, Maturin Livingston, New York; a, Mortimer C. Merritt; b, Rulof Van Brunt.

Ten Eyck st, n s, 54 e Bushwick av, 2 bldgs; cost, \$20,000; o, St. Catharine's Hospital, Bushwick av and Mauger st; a, Wm. Schickel; b, Ulrich Maurer.

River front, Congress st, Warren st, 2 5-story br ware-houses; cost, ea, \$25,000; o, Jeremiah P. Robinson.

Spencer pl, e s, 84 n Fulton st, 2 4-story br flats; cost, each, \$20,000; o, W. J. Northridge, 56 Myrtle av; a and b, Rulof Van Brunt.

President st, n s, 112 e 8th av, 3 3-story and bmt b s dwells; cost, each, \$12,200; o, Louis C. Raegenier; a, Charles L. Mott; b, day's work.

Herkimer st, n e cor Howard av, 13 2-story and bmt br dwells; cost, each, \$2,000 or \$2,200; o, Besy T. Robbins; b, E. K. Robbins.

ALTERATIONS, BROOKLYN.

232 Clinton av, 3-story br extn; cost, \$15,000; o, Chas. Pratt, on premises; a, Sturgis & Brigham; b, Morris Building Co.

BOSTON.—Columbus av cor Northampton st, br church; o, Advent Soc.; a and b, J. H. Kelly.

Wellington st, br family hotel; o, S. Stubbs; a and b, J. H. Kelly.

1671-77 Washington st, 4 br dwell and st; o, R. H. Allen; a and b, J. E. Potter.

5-15 Worcester st, 6 br dwell; o, G. A. Gibson; a and b, J. E. Potter.

Tremont st cor Huntington av, 6 dwells; o, A. Geiger; a and b, A. D. Gould.

Dorchester av nr Dorchester st, 2 dwells and st; o, P. Campbell; a and b, E. W. Archer.

Adams st nr Everett st, 2 dwell; o, F. F. and A. A. Monte.

Gilbert st nr Roys st, 3 dwell; o, J. Handwork; a, J. Hammerle.

Spring Park av opp Enfield st, 2 dwell; o, D. Breivodel; a and b, J. Westoe.

BUFFALO, N. Y.—Pearl st, block of 5 apart houses, 3-stories and basement, 100 x 50 ft; cost, \$25,000; o, W. H. Peabody; a, F. W. Humble; b, Chas. Berrick.

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THE NATIONAL ASSOCIATION OF MASTER PLUMBERS.

THE association has held its second annual meeting, and separated. It brought together a large number of delegates—larger than attended the first meeting in New York, and, if possible, showed more enthusiasm than then for national organization, every delegate evidently feeling that the best interests of the craft at large rested upon the shoulders of the delegates present.

On one point it earned unreserved congratulations—that it took up the very troublesome question that came before it from New York in the spirit of fairness and with the good judgment which settled it in such a way as is not likely to leave embers of discord to trouble the association during the coming year.

The other principal matter which the association had to arrange, the permanent organization, was perfected substantially as outlined by the committee of the Chicago association.

In only one important particular did the convention depart from the framework of the constitution as proposed by the committee—viz., by declaring that the chairmanship of the Executive Committee shall hereafter be vested in the president of the association.

The essays, which formed a chief feature of the convention, covered an immensely wide field. With the resolutions which the convention adopted they furnish a programme of action, not for one, but for many years.

The management has gone to the West. The East chiefly organized, and the West will now carry it on. As the sentiment of the convention set for the West it was the part of wisdom to give to the Illinois president the co-operation of officers from the valley of the Ohio and Mississippi.

DISINFECTION OF POLLUTED SOIL.

DISINFECTION is the destruction of the specific poisons of contagious or infectious diseases. The causes of these diseases are now believed to be minute living particles of matter; some of them are known to be minute vegetable organisms or microphytes, which can live and multiply either within or without the living body; the nature of others is totally unknown, except that we can say with a good deal of certainty that they cannot be gases or liquids. Being extremely minute and easily carried about by currents of air or water, from which last it is very difficult to insure their removal by ordinary filtration, it would seem evident that the first principle of disinfection is to attack these poisons or germs at their origin as far as possible, and before they are scattered.

The best place to apply disinfectants in scarlet fever, for example, is to the skin of the patient, and to the discharges from his throat, nose, bowels, and kidneys, because it is in the excretions and *débris* from these sources that the poison is most apt to be contained. The second principle is to keep the surfaces or substances which are to be disinfected moist until the process has been accomplished, or, in case they have become dry, to moisten them before moving them, in order to avoid the production of dust and the scattering of the minute dangerous particles. We do not propose to discuss the merits of various disinfectants, taking it for granted that the uses of heat, bichloride of mercury, salts

of zinc and iron, chlorine and sulphurous acid, etc., are sufficiently well known to our readers. The special point which we wish now to consider is the so-called disinfection of soil polluted by organic matters, as by a leaky cesspool or house-drain. When, in the progress of human events and of civilization in that particular locality, a leaky drain beneath a house is discovered, and the owner has made up his mind to replace it with a sound one, properly laid, or when the ancient family cesspool or privy-vault is to be abolished, the question comes up, What is to be done with the dark offensive earth in the vicinity of the old pipe or pit? and it will often seem as if the cheapest and easiest course was to disinfect it—to saturate it with a solution of copperas, for example.

Bearing in mind the definition given above, it will be seen that disinfection is hardly the proper term to use in many such cases, since there is no particular reason to suppose that any germs of specific disease are present, although there is a great abundance of the ordinary micro-organisms of putrefaction. What is wanted, if this foul earth is to be allowed to remain, is something that will not only put a stop to the putrefactive process, but render the mass permanently incapable of furnishing the conditions of growth and development to germs; in other words, an antiseptic rather than a disinfectant. But to make a mass of polluted earth permanently antiseptic is a very difficult matter, so difficult that it is much wiser and cheaper to dig it up and carry it away, replacing it with clean fresh earth, and this is the course of action which we would strongly recommend under such circumstances. Dispose of the foul earth as you would the sewage with which it is contaminated. After all, there is but little difference between them, and do not leave the work half done. Dry clean earth is the best deodorant, disinfectant, and antiseptic under such circumstances, and in almost every case it is much the most economical. To what extent micro-organisms escape into the air from polluted soil is somewhat uncertain—probably the danger from this source is not great—but, at all events, the offensive gases which such soil gives off do escape very readily, and it is certainly worth while to prevent their appearance.

POLITICAL TRADING IN SCIENTIFIC SURVEYS.

It is reported that the Appropriation Committee of the House of Representatives has determined to abolish the United States Coast Survey as an independent organization under the Treasury Department, and transfer its work to the Geological Survey and the Navy Department.

The Governor of the State of New York has vetoed the appropriation for the State Topographical Survey, and has assigned as the reason for so doing that, in his opinion, the State Engineer and Surveyor ought to do the work.

It becomes the duty of every person in the United States who is intelligent enough to understand the difference between geology and geodesy, and between hydrography and navigation, to protest vigorously against the dismemberment and disintegration of the most thoroughly organized, perfectly equipped, and

scientifically conducted of American executive bureaus—the one which of all others has done credit to the country, and is appreciated and respected throughout the civilized world. The only way to reach the members of Congress who are capable of carrying out this plan of disorganization, is to make them feel that their popularity will be diminished by their action. Arguments on the merits of the case would have no effect on them.

As regards the New York State Survey, the mischief is done for this year. We have already expressed our opinion of the proposition to place a scientific work requiring skill and experience in the hands of an official elected by popular vote, not for his scientific attainments, but solely for his political affiliations. The Governor would not, we presume, select a ship-carpenter to make an office-desk, nor would he choose a blacksmith to make a clock, but he has suffered himself to be misled into an act equally foolish, through his want of knowledge of the fact that, under the general term, civil engineering is now embraced in a great variety of special branches, the attainment of a high degree of skill in any one of which is as much as any one man can master, and that it does not follow that because a political convention has approved of the record of a proficient in one branch, he is therefore qualified to conduct the operations of another entirely different branch.

WATER AND STATE RIGHTS.

THE decision of the United States Circuit Court in the Enfield Dam case is of importance to riparian owners on streams which traverse different States. The Connecticut River Company was authorized by the State of Connecticut to raise the level of its dam at Enfield. This raising would set back the water of the pond into the State of Massachusetts and diminish for several months in the year the head of water at the dam of the Holyoke Water-Power Company, which applied to the United States Court for an injunction restraining the Connecticut corporation from thus damaging its business. The injunction was ordered to issue, on the ground that while the State of Connecticut had undoubtedly right to grant the right to a corporation to injure land in the State, it had no power to authorize the taking of or injury to real estate outside of its jurisdiction in another State. By virtue of the power of eminent domain, it can convert to public use any land within the limits of the State, but not any land outside of those limits. This ruling of the court may have a bearing on the proposed Ramapo scheme for supplying water to New York, for while the case is different and is decided on grounds which could not apply to the Ramapo, the principle of non-interference with exterior rights is plainly laid down in Judge Shipman's opinion. He says: "Jurisdiction comprises the power and the right to inflict consequential injury, but when no jurisdiction exists the right ceases to exist. It is a recognized principle that the statutes of one State in regard to real estate cannot act extra-territorially."

THE cholera has made its appearance in Toulon, and the French authorities are preparing for an epidemic. There seems no reason to doubt that it is Asiatic cholera, and that it was introduced through a transport ship. There is every reason to fear its spread, for all attempts to limit it by inland quarantine or measures of isolation have heretofore been useless, and it is probable that it is merely a question of time as to when it will reach our own shores—i. e., whether we shall have it this year or next.

When it does come it will probably not flourish in our large cities so well as in the smaller towns, where the water-supply is from wells, and sewage is disposed of in leaky vaults and cesspools. All such places have now had ample warning, but we fear few will profit by it.

As the Sundry Civil Appropriation Bill passed the House, it contains the following clauses:

"That all laws or parts of laws authorizing the appointment of a National Board of Health be, and the same are hereby repealed."

"United States quarantine buildings, Marine Hospital Service, Gulf quarantine: for building wharf, ten thousand dollars."

The Senate has since struck out the clause abolishing the Board, and the House will, it is believed, accept this change in the bill.

OUR BRITISH CORRESPONDENCE.

Meteorology of the Past Year—Conferences at the Health Exhibition—Cow's Milk as a Vehicle of Infection.

LONDON, June 14, 1884.

THE following particulars relating to the meteorology of the past year are taken from the annual report, just issued, of the Astronomer Royal at the Greenwich Observatory to the Board of Visitors. The mean temperature of the year 1883 was 49.3°, being 0.4 lower than the average. The highest air temperature was 85.1°, on August 21, and the lowest, 20.6°, on March 24. The mean monthly temperature was above the average in January and February, and below in March and July. In other months it differed little from the average. The mean daily motion of the air in 1883 was 291 miles, being 12 miles greater than the average. The greatest daily motion was 842 miles on December 12, and the least 62 miles on December 26. The number of hours of bright sunshine during 1883 was 1,241, which is about 30 hours above the average of the six preceding years. The aggregate number of hours during which the sun was above the horizon was 4,454, so that the mean proportion of sunshine for the year was 0.28, constant sunshine being represented at 1. The rainfall in 1883 was 21.9 inches, being about 3 inches below the average. It is recorded that no marked connection between magnetic or electrical disturbances and the phenomena of the remarkable sunsets of the past year was noticed.

During the past week conferences have been held daily at the Health Exhibition, when papers more or less connected with sanitary matters have been read and discussed. In a paper read yesterday by Dr. Thursfield, on "Milk as a Source of Disease," some interesting facts were adduced. The author dealt chiefly with the subject of cow's milk as a vehicle of infectious and epidemic diseases to the community, coupled with suggestions for the more effectual prevention of outbreaks of such diseases. He stated that the use of milk by adults had enormously increased, partly owing to the fact that the proportion of women physically incompetent to suckle their offspring was annually increasing. He said that, making allowances for all doubtful cases, it might be accepted as an absolute fact that epidemics of typhoid and scarlet fevers had been repeatedly disseminated by milk, and that there was very strong evidence that diphtheria had been so disseminated. In the case of the majority of milk epidemics, typhoid fever had been the disease involved, and he added that if there was one fact which more than any other had been uniformly brought out in milk epidemics, it was that the consumers of boiled milk had, as a rule, escaped, and the same fact had been noticed in outbreaks of an American epizootic. The author suggested that the urban sanitary authority should have the power to stop the sale of milk consigned from any particular farm pending investigations, and that the retailer of milk should be called upon to furnish a list of his customers. In the discussion which followed the reading of the paper, Professor de Chaumont said that the view accepted in England, that milk was the means of communicating enteric and scarlet fevers, was by no means accepted abroad, where, in fact, it was ridiculed. He believed a frequent way in which typhoid fever was conveyed by milk was the adulteration of it by impure water, and scarlet fever might be disseminated by the poisonous "scales" from a person engaged in the process of milking. Several other speakers took part in the discussion, but they all agreed that milk under certain circumstances was a source of disease.

SAFETY-VALVE.

RENWICK M. MACLEOD, Chief Sanitary Inspector of Glasgow, Scotland, is in this city studying the system of house-drainage.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. I.

WATER-SUPPLY AND DRAINAGE.

WE begin in this article a description of the plumbing, with its appurtenances, and such other matters as we think will be of interest to our readers, of the new house now being built for Mr. Henry G. Marquand, at the northwest corner of Madison Avenue and Sixty-eighth Street, in this city, from plans by Mr. Richard M. Hunt, architect, and under the superintendence of Mr. Maurice Fornachon. The master plumber is Mr. Alexander Orr, of 19 East Eleventh Street, in this city.

Our illustration, Fig. 1, is the ground plan of the building, and all outside the wall, X, Y, Z, is either under the sidewalk or forms light areas.

The principal source of water-supply is from the Croton main at the Sixty-eighth Street side of the building, at *m* and *n*; the pipe *m* being for the direct service, and the pipe *n* being for the sole purpose of supplying the Ericsson hot-air engine at *g*, which forces the water to the tank in the top of the house for a high or indirect service. These pipes are both drawn-brass, tinned, and two inches in diameter.

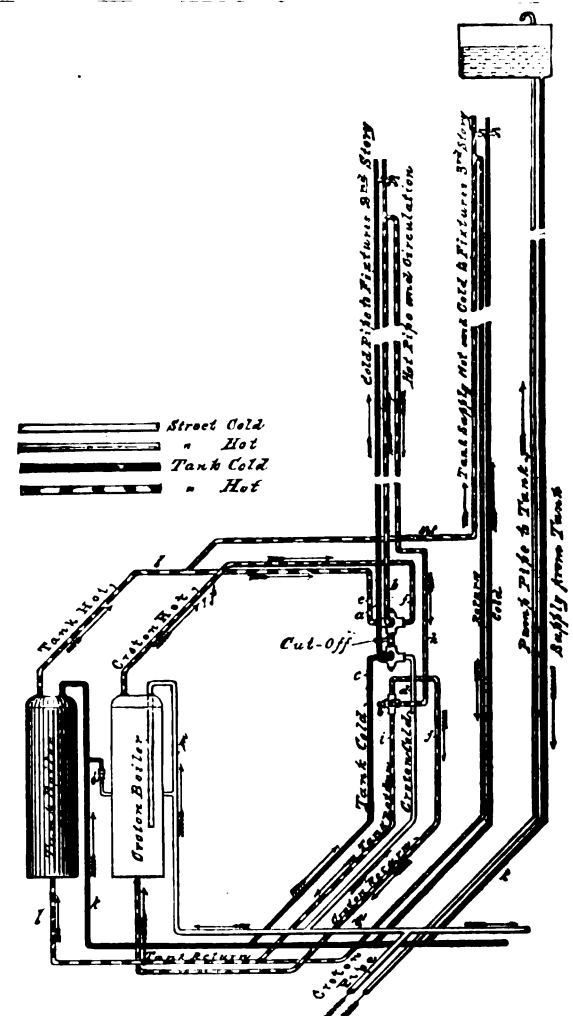


FIG. 3.—WATER DISTRIBUTION.

On account of the house having but a single regulation tap, ——— inches internal diameter, it was necessary to carry these pipes to a point as near the main as possible, before uniting them, to prevent the action of the pump when in operation from making a pulsation or intermittent flow of the direct house-service.

To accomplish this, a drum or header *b*, shown broken in the diagram, Fig. 2, is used. It is four inches in diameter and about five feet in length, and is united to the main by the service-cock *c*. This method lessens friction, and allows the disturbed water currents to assume direction, giving a result almost equal to separate taps, and making it practicable to use large pumps for tank-supply where only one tap can be obtained.

At the Madison Avenue side of the house, at *o*, is a separate service-pipe, two inches in diameter, carried to the street, and connected into the general supply of the house. This pipe is not connected with the main on Madison Avenue, but is put there with the hope of obtaining permission to tap this pipe, so as to insure a supply to the lower part of the house, should the Sixty-eighth Street main be shut off, as must frequently occur.

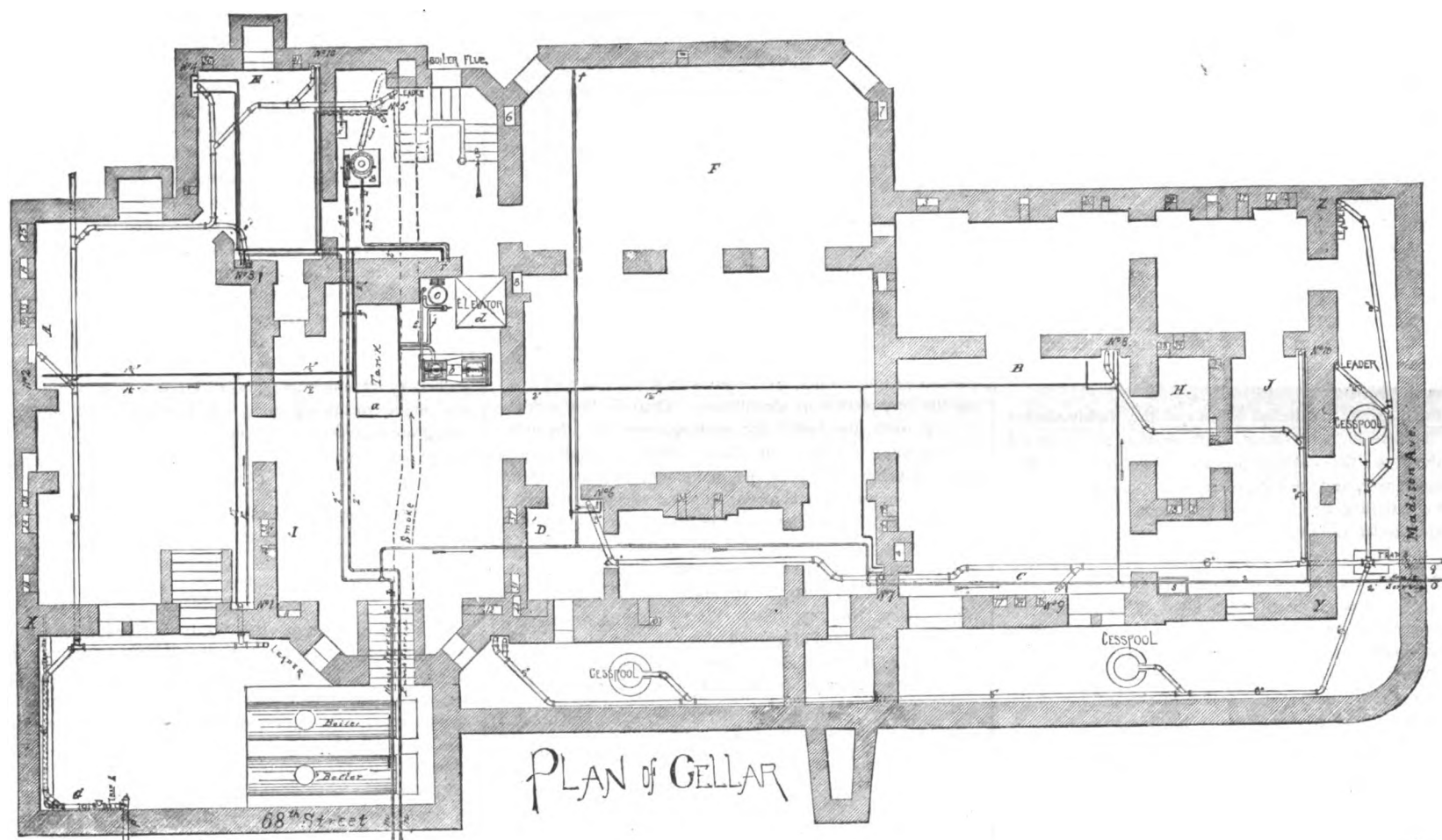


FIGURE 1.

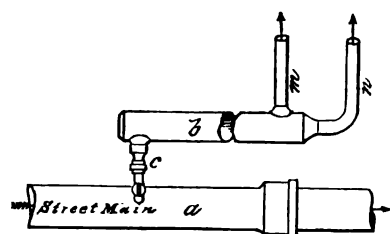


FIGURE 2.

The course of the direct supply—called in New York “Croton supply”—is from *m*, in the direction of the arrows, through the pipes, indicated by two lines. The course of the indirect supply—called “tank” or high pressure—is through the pipes *n*, *h*, to the pump, thence through the pipe *i* to the tank at the top of the house, through the recess *r*, down which recess the tank-supply pipe is again taken to the cellar for distribution through the pipes indicated by the solid black line, which, it will be noticed, run to similar points in the cellar, as do the direct supply-pipes, numbering, consecutively, from 1 to 8, inclusive. The capital letters on the plan, with the exception of X, Y, and Z, indicate positions in the building over which are situated apparatus or fixtures to be described and illustrated in following numbers. Over A is the kitchen, with its high and low-pressure boilers and hot-water supply; over B is the laundry-boiler and range; over C, laundry-tubs; over D, the servants’ bath-room; over E, butler’s pantry; over F, the fountain; at G, a detail of house-drain; over H, the clothes-drying room; over I, the ice-house; over J, the conservatory, and over the rising lines marked by *numbers*, plumbing fixtures, bath-rooms, etc.

Before giving a description of the hot and cold water supply in detail, we will describe briefly other features shown in the cellar plan.

The house-drainage is divided; part goes to the sewer at Sixty-eighth Street and part to Madison Avenue, as shown. The system used is that approved by the New York Health Department, and is, in the fewest words, commencing at the street: The house-sewer; a house-trap at area wall; a foot-vent, taken from near the curbstone; the necessary horizontal ramifications of the house-drain of the sizes marked and leading to the risers and the leaders, rising lines extending above the roof; separate traps for every fixture; separate vent for every trap; back-air lines from trap-vents, extending above the roof; trapped rain-water leaders where they enter the house system; separate drains

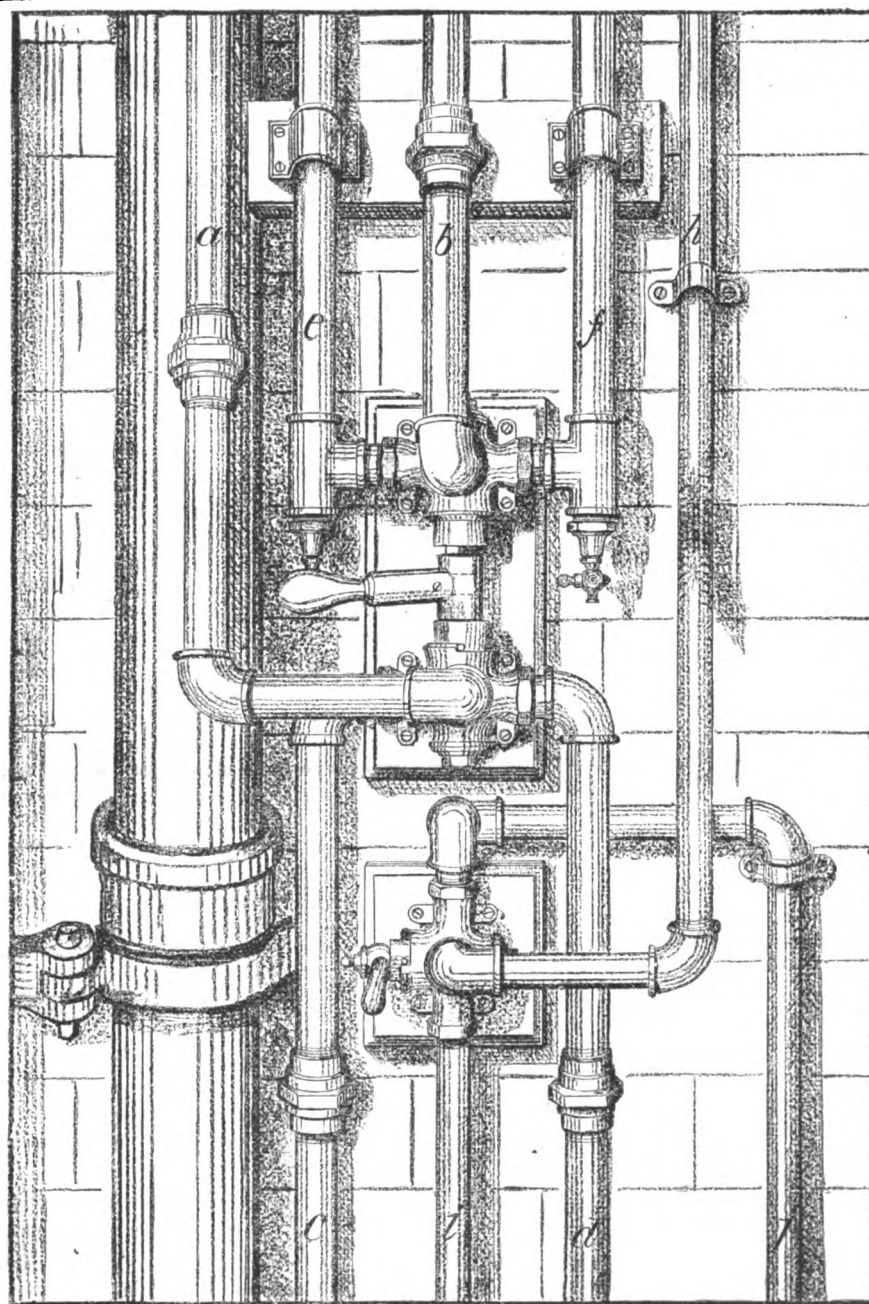


FIGURE 4.—DETAIL OF CUT-OFF.

for the majority of the rain-leaders and the area cesspools; entering an "ever-sealed" trap at 3, Madison Avenue side.

At the position marked "elevator" is one of the Whittier passenger-elevators, worked by hydraulic pressure; *d* is the elevator car; *c*, the vertical cylinder, twenty-four inches in diameter; *e* and *f*, the water-circulating pipes, and *a*, the lower tank, 4 feet wide by 12 feet long by 6 feet deep, from which the Dean steam-pump *b*, with eight steam cylinders and 5-inch water-cylinders by 14-inch stroke, forces the water again to the elevator-tank in the top of the house.

The diagram, Fig. 3, is the scheme of the combined methods of water distribution—*i. e.*, low and high-pressure and cold and hot-water systems—and it is introduced to make clear to the reader the general system, previous to illustrating in detail any of its parts, that he may be able to group them and form a just conception of their relation as they appear.

In the diagram the shaded boiler and the darkly-shaded pipes indicate high pressures, or those that are supplied from the tank; the cold high-pressure pipes being unbroken lines, such as *k*, and the high-pressure hot-pipes and their return circulations being broken lines, such as *l*, while the unshaded boiler and pipes indicate low pressures or Croton pipes, the hot being distinguished from the cold by a broken or dotted line through their centres.

All the cold-water distributing-pipes, either from street or tank, are brought to the cellar ceiling, from which they are hung; thence run to their respective rising lines. All the warm-water distributing-pipes, whether from the tank boiler or Croton boiler, are carried to the ceiling of the basement, and thence run to the rising lines.

All water taken to the third story is from the tank-pipes, and no provision is made for any other supply or "change-off," as the Croton pressure can rarely be expected to reach there.

All water taken to the second story is from either of the two systems, with the means at every line of changing from the street system to the tank, or *vice-versa*, the particulars of which will be given below.

All the water taken for the first floor, basement, and cellar is from the street pressures.

The diagram now shows the second floor supplied with hot and cold water from the tank, according to the shading of the pipes; for instance, the cold water from the tank passes through the pipe *K* and its branch *C*, in the direction of the arrows, to the "cut-off," where it enters the pipe *a*, which runs to the fixtures. In a similar manner the tank water from the pipe *K* enters the boiler, where it is warmed, and passes through the pipes *l* and *e* to the "cut-off," thence through *b* to the fixtures, returning through the circulation-pipe *h*, to the lower three-way cock of the "cut-off," thence through the pipe *i* to the general return-pipe *l* to the boiler. Reverse the handles of the cut-off valves, and the Croton water will then pass from the pipe *m* to the pipe *d*, thence through the pipe *a* to the fixtures, while the course of the hot water will be from the Croton boiler through the pipe *f* to the cock, and through *b* to the fixture, returning by the pipes *h* and *j* to the boiler.

At *a'*, between the boilers, is a check-valve in the pipe connecting the pipes *M* and *K*. This is to allow the street pressure to pass into the tank-boiler, and keep it supplied, should the tank become empty.

Figure 4 is a detail of the "cut-off" used in riser No. 1, the letters corresponding to those used in similar parts in Fig. 3.

(TO BE CONTINUED.)

FLUCTUATIONS OF GROUND WATER AND RESULTANT DISEASE.

MR. BALDWIN LATHAM, M. Inst. C. E., writes to the *London Times* that the indications are that there will be in England during the coming autumn a general low state of the ground water, and that this has occurred with regularity every tenth year since 1854. He adds:

"Whenever the water in the ground has reached a considerable degree of lowness, when replenishment commences, in all places in which the water is liable to pollution, we have the conditions which bring about epidemics of typhoid fever, and it therefore behooves all persons who are suspicious of the quality of their water-supply to take the precaution to have all water used for dietetic purposes boiled before it is used during such periods as we are now entering upon. By adopting this precaution much illness and suffering may be prevented."

THE INTERNATIONAL HEALTH EXHIBITION.

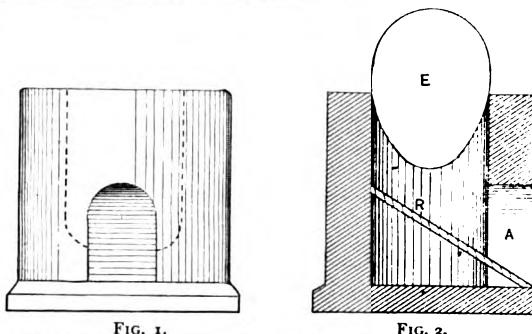
No. VI.

(Continued from page 73.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

GENERAL APPEARANCE OF THE EXHIBITION—MODEL DAIRIES.

South Gallery.—The four model dairies referred to in the previous article are situated about half-way down the South Gallery on the left-hand side as you enter from the Exhibition Road. The first of these four (No. 245) is fitted up by Bradford & Co., of High Holborn, London, and consists of four rooms, each lined with white tiles and looking the very picture of cleanliness. There is the milk-receiving room, the boiler, the working-room, and the milk-settling room. There is no drain within the building, but the floor being built on an inclined plane, with an earthenware channel running along it, all the drainage is conveyed outside the building into a grid placed for the purpose. The building is well ventilated and warmed, and is stated to be complete with all the most modern apparatus for making and preparing butter. Adjoining this exhibit is Welford's dairy (No. 247), of St. Peter's Park, London, W., which is constructed after the fashion of a farm-house. The interior is fitted with a shed containing six Alderney cows in stalls, and four goats in a paddock. There is a can-cleaning room, butter-making department, and a laboratory fitted up with appliances for the analysis of milk. The interior of the building is lined with white tiles and windows



filled with stained glass. The whole structure is furnished throughout with the latest sanitary arrangements, as approved by the Sanitary Assurance Association. Next to Welford's comes (No. 243) the dairy of the London and Provincial Dairy Company, 4 Halkin Street, London, W., which is not quite so tastefully got up as Welford's, but covers more ground. Here is a complete collection of everything in the way of live-stock, poultry, etc., appertaining to a first-class dairy-farm. The various methods of making butter and cheese and of extracting cream are fully demonstrated, as well as the systems for preserving dairy produce in refrigerators and dry-air machines. The Express Dairy Company's (Bloomsbury Mansions, W. C.) exhibit (No. 244) comes next. This dairy is very large and substantially built and seemingly contains all that a modern dairy-farm should. There are four cows kept in the building, besides several goats, and cheese and butter making in their various stages are fully demonstrated. All the appliances connected with the ventilation and sanitary arrangements generally of dairies are also shown.

There is an interesting exhibit (No. 200) in the South Gallery, by Otto Hilmer, of 64 Friedrich-Strasse, Berlin, consisting of an egg-tester. It is a small machine, made of tin, and hollow, about four inches high, in shape like a pepper-box, having a cavity at the top and an opening at one of the sides, and fitted internally with a reflector placed at an angle of 45°. The egg to be tested is placed in the cavity of the top, which serves as a kind of egg-cup, and its image is reflected on the glass within. By looking through the side opening at the glass, if the image of the egg looks transparent the egg is good; if opaque, it is bad. Perhaps the subjoined rough sketch may serve to make the description plainer. Fig. 1 represents the general appearance of the machine, while Fig. 2 shows in section the mode of placing the glass.

EAST ANNEX.—PLUMBING AND WATER-FITTINGS.

The East Annex and East Gallery, which are reached by the first turning on the right out of the South Gallery as you enter from the Exhibition Road, contain exhibits of special

interest to the sanitary engineer, but as all the important exhibits will hereafter be described in detail in these columns, the present article will be confined to a general account of the contents of these sections.

In the East Annex are exhibited specimens of water-closets, earth-closets, commodes, urinals, and water-fittings. The East Gallery is given up to exhibits of house decorations, etc., such as non-arsenical wall-papers and washable wall-papers. There are also exhibited in this section various specimens of flooring-tiles and parquet flooring. The East Arcade is given up to grates, stoves, ranges, of every description, size, and manufacture, some of very pretty design and all possessing, according to their respective makers, features of peculiar interest. The Nautilus grate, exhibited by Mr. T. Petter, of Yeovil, Somerset, is of rather novel design. In form it resembles a nautilus shell and is described by its maker as a fire-brick lined, slow combustion, and smoke-consuming stove. It burns ordinary soft coal. The grate may be readily removed, being on wheels. The smoke passes out of side pipes into the chimney.

EAST QUADRANT.—HYGIENIC DRESS.

Passing through the last arcade and the refreshment-room at the end of it, we come to the East Quadrant, in which specimens of modern dress are exhibited, and so-called hygienic boots and shoes, constructed, as alleged, on anatomical principles. Here we have specimens of the "Perfect" boot, the "Sensible" boot, and the "Natural" boot, etc. Continuing our journey through the East Quadrant we arrive at the stalls at the back of the Albert Hall devoted to lace-making, and in the West Quadrant we find exhibits of specimens of ancient dress, wax figures dressed up, in glass cases, each case containing four, and illustrating the various fashions from William the Conqueror's time to the present century. Mr. Wingfield has personally superintended the execution of these exhibits, and in every case they are said to be copied from authentic pictures of the period. Some of the costumes are very remarkable, particularly those of the time of George III., when huge head-dresses were worn by men as well as by women, and of George II., when fashionable ladies wore enormous hoops made of cane-work, the diameter of some of the skirts appearing to be about four feet.

(TO BE CONTINUED.)

ARRANGING CHEAP IMPROVED DWELLINGS.

In discussing the character of the accommodations which should be provided in dwellings at low rents for the laboring classes, Mr. T. Chatfield Clarke said recently, before the Surveyors' Institute in London, that through ventilation from front to back should be obtained if possible, and it should be a cardinal point to arrange the rooms not side by side, but as front and back.

The staircases to the blocks or dwellings should be open to the air, and each set of rooms should have its private door as if the staircase was the street; open galleries should be avoided as destructive of privacy.

In every case where it is possible the arrangement of the closets should be on open galleries, or, at least, entered through a scullery or wash-house, with direct access to the outer air.

The plan of lavatories and water-closets off the staircases is not one that should be extensively followed.

A simple and inexpensive system of fire-proof flooring should divide the floors throughout.

When at all possible, some play-yard or drying-ground should be attached to the buildings, and, if possible, wash-houses for laundry purposes.

In planning the buildings, an effort should be made to enable some rooms to be let off as single rooms, with a power, however, of adding two or three together if needed. Preserve, as far as possible, a cheerful and cottage style of dwelling, as opposed to dull and heavy blocks.

Care should be taken that all the sanitary and other appliances should be of the simplest, yet, at the same time, of the strongest character.

As a sanitary aid in the construction of such dwellings, the walls and the ceilings be of the hardest material possible, and able to be often cleansed.

PERSONAL.

CITY ARCHITECT VINAL, with the President of the Directors of Public Institutions, and Committee on New Buildings and Repairs, of Boston, is making a tour of inspection in the principal Eastern cities, preparatory to the construction of the new hospital on Deer Island, for which Boston City Council has appropriated \$60,000.

THE NATIONAL CONVENTION OF MASTER PLUMBERS.

THE second annual convention of the National Association of Master Plumbers of the United States, of which the notes of preparation have been heard all the year, latterly growing loud and a little discordant, has met at Baltimore and dispersed. To about the number of 140, delegates from the local associations met at the Masonic Temple, in that city, on the 25th of June, and continued their session into the third day, settling the framework of the association which had been laid down in New York a year ago.

To the looker-on, disregarding the changed hall, the convention at 10 o'clock Wednesday morning presented much the same appearance as a year ago. There were the same names on the association banners, in the main. A few had been added. There were the same faces on the floor, and the same voices were heard in debate. In the front this year were Providence, Brooklyn, and Boston; New York to one side of the president. Then behind the front row came Chicago, Wilmington, and Columbus, and close behind these Cincinnati, St. Louis, Cleveland, and Baltimore, with others in the rear. George D. Scott, of New York, President of the National Association, presided; Edward Murphy, of New York, was the secretary.

On calling the convention to order at 10.30 A. M., Mr. George D. Scott, President of the Master Plumbers' National Association, briefly noted that a recess had been taken from 10 o'clock, when the convention had first assembled, to that hour. The first thing in order would be the appointment of the Committee on Credentials. Mr. Birkett, of Brooklyn, moved that the Committee on Credentials be appointed by the president and consist of five members. Mr. Boyd, of Chicago, amended so that every delegation consisting of five members should name a member of the Committee on Credentials. His amendment was carried, and it then being discovered that the amendment would exclude Washington and Hudson County from representation on that committee, as their delegations did not contain five members, Mr. Boyd was allowed to withdraw his amendment and offer another which allowed each delegation to name a member of the committee. This was agreed to, and the committee was appointed from the several delegations.

The committee then retired, and a recess was taken until 12.30 P. M.

At 12.30 the convention reconvened, and Mr. Foster, of Norfolk, presented the report on behalf of the Committee on Credentials. He said they had the credentials of one hundred and forty-one delegates, and that the committee desired to be continued, that they might be prepared to receive any other credentials which might require action.

A motion was made to discharge the committee and appoint a new committee of three.

It was moved to lay that motion on the table and receive the report of the committee.

The original motion was withdrawn.

The report of the committee was then presented, as follows:

The Committee on Credentials beg to make this, their report, and present a roll of members of this convention of Master Plumbers of the United States.

For the committee, W. E. Foster, chairman; T. C. Boyd, secretary.

NEW YORK.—J. A. Macdonald, George D. Scott, I. O. Shumway, Edward Murphy, E. J. Brady, E. B. Cunningham, Cauldwell Frazer, N. G. Geraty, John Toumey, J. J. Sullivan, A. L. Whitelaw, William H. Quick, Samuel Clark, William Young, R. W. Ward, William H. Richards, T. J. Byrne, E. J. O'Connor, A. Mead, John Mitchell, John Renehan, George B. Brown, Timothy Sullivan, Alexander Low.

BALTIMORE.—John A. Wilson, John W. Bechtel, John F. Dwyer, John F. Dooley, John Trainor, P. T. Barry, William R. Brodie, H. C. Bowman, D. B. Foster.

PHILADELPHIA.—F. P. Brown, George T. Gabell, J. E. Eyanson, A. M. Hicks, J. H. Lyons, J. S. McGinley, N. L. Owens, J. J. Weaver, A. G. Bond, Harry Coffin, William Harkness, Jr., J. A. Heffron, William McCoach, W. W. Mentzinger, Enoch Remick, William M. Wright, George F. Ula.

BROOKLYN.—James W. Birkett, Bernard Reid, George Cummings, O. O. Sawkins, Martin Fallon, James J. Powers, James F. McNulty, M. J. Lyons, George E. Lewis, Samuel Bowers, Joseph Zoll, Thomas Hudson.

CHICAGO.—Edward Baggott, T. C. Boyd, Elias C. Brown, A. W. Murray, James H. Roach, J. J. Clark, William F. Gay, Jacob Webber, James McGinley, P. Noey, John Saunders, J. J. Wade, William Simms, S. J. McGraw, John J. Hamblin, Andrew Young.

WASHINGTON, D. C.—E. J. Hannan, J. Nolan, J. Regan, T. Fritz.

CLEVELAND.—Burrows, Peter Desnoyers, J. J. Smith, John Rolt.

ST. LOUIS.—W. H. Graham, P. Madden, J. P. Gallagher, J. Sheehan, D. J. Collins.

HARRISBURG.—F. J. Boechner, James H. Lutz.

DES MOINES.—J. E. Allen.

LOUISVILLE.—M. J. Duffy, C. O'Connor.

COLUMBUS, O.—William Hally, E. A. Futern, C. A. Elie.

PROVIDENCE.—Thomas Phillips, Patrick Tierney, E. Frank Carey, George R. Phillips.

CINCINNATI.—James Allison, O. Schreiner, James A. Gibson, Thomas McNeal, James Semple, S. Nolan, R. Murphy.

KANSAS CITY.—E. Doherty, J. L. Ryle.

ST. PAUL.—J. J. Dunnigan.

INDIANAPOLIS.—George W. Keyser, Charles Anshadsl.

HUDSON COUNTY, N. J.—J. F. Blackshaw, J. Zumbusch, A. A. Donnelly, J. H. Kniffen, M. P. Moran.

BOSTON.—Isaac Riley, D. G. Finerty, I. N. French, James Tucker, J. H. Stevens, Henry Hussey, James F. Davlin.

PITTSBURG.—I. K. Becker, James G. Weldon, William Victory, James Anderson, S. W. Hare, J. P. Reinich.

NEW HAVEN.—J. H. Buckley, William Keane.

WHEELING.—John S. Trimble.

WILMINGTON.—A. Gawthrop, Joseph H. Jones.

NORFOLK.—W. B. Davis, W. E. Foster.

DETROIT.—T. P. Tuite, S. W. Wayson, J. D. Mouat.

DAYTON.—George H. Ware.

CANTON.—L. B. Cross.

James M. Heatherton, of New York, here handed to Mr. Foster a paper presenting his claims to be considered a member of the New York delegation.

Mr. Foster desired to present it to the convention. Mr. Abram Mead inquired whether the paper was addressed to the association, or had simply been handed to the Committee on Credentials. President Scott understood it had been handed to the committee after they had retired from the room. It was addressed to the Committee on Credentials.

Mr. Foster—I am not familiar with its contents. I have looked over it hurriedly, however, and find it is in reference to the very matter in the hands of the convention. I think it should be read before the vote is taken upon the report of the committee.

A delegate moved that it be referred back to the committee.

Mr. Macdonald, of New York—I hope it will not be read in the convention until the committee hear it.

The motion to refer the communication to the Committee on Credentials was adopted.

Mr. Davlin, of Boston, thought the Committee on Credentials should ascertain the contents of the communication and present it to the convention. "Let us refer the matter back to them, that they may perform their duty and give us a full report to act upon."

Mr. Weldon, of Pittsburgh—I move that the committee be discharged, and a committee of two, with the present chairman, be appointed to consider the matter.

Mr. Foster, of Norfolk, wished to be excused unless he had the whole committee with him. He declined to serve on a committee of three. Give him the whole committee and he would serve with them. Still he would rather see a smaller committee.

The President—It appears to the chair it ought to be referred back to the original committee.

A Delegate—I would suggest that the original committee be authorized to designate a sub-committee to consider the matter and report to them.

The President—I think the matter should be left in the hands of the committee. If there is no objection I will put the original motion that this matter be referred back to the Committee on Credentials for report.

Mr. Weaver, of Philadelphia—I would ask whether the entire report is to be referred back to the committee.

The President—The report will be returned to them, and they will report again at the completion of their labors.

Mr. Low, of New York—If this committee is going to go back for a final report, would it not be well for them to receive delegates who have come here from a great distance, although they have not paid their per capita tax? Should they not at least be allowed the privilege of being alternates at this convention? I move that these men shall at least be made alternates in this National Association.

Mr. Kniffen, of Hudson County—The Committee on Credentials had only the credentials to work upon. We could not place anybody in the report who had no credentials. We could not leave anybody out of the report who had credentials. Our duties have been perfectly performed so far as we have gone, and we are still a committee waiting for others who may come in, in order that we may pass upon their credentials when they are presented. I do not see that any change is necessary. We can only accept the credentials as they stand. We cannot admit people who come here as delegates without credentials, no matter how far they come. We would be glad to receive them, but that is a matter that rests with this association after the Committee on Credentials has made its report.

Mr. Davlin, of Boston, moved the previous question.

The President—It has been regularly moved and seconded that the report of the Committee on Credentials be referred back to them for further corrections or amendments.

Mr. Hannan, of Washington—I do not see why the time of this convention should be wasted with some paper. We do not know what it is. If it is a credential, let it be referred back.

Mr. Davlin, of Boston—Let us refer the matter back to the committee and let them report to us, and then we can settle it.

Mr. Hannan—We are not aware of the contents of the paper.

The motion to refer back was adopted.

The convention took a recess until 3 P. M.

It may be mentioned here that the Milwaukee Association, not being present, wrote requesting to be represented by proxies. Mr. Scott, no objection being made, ordered a proxy. The San Francisco and Oakland Associations appointed Mr. Kirk, of Oakland, to act as delegate for them.

The convention was called to order at 3 P. M.

Mr. T. C. Boyd, of Chicago, in the absence of Mr. Foster, presented the report of the Committee on Credentials, as follows:

"Your committee, after deliberation, see no reason to change their report, and beg to submit it in its original form."

The paper referred to them accordingly received no further action.

Mr. Low, of New York, moved that the report of the committee be accepted.

Mr. Davlin, of Boston, thought the report of the committee should not be accepted until the papers referred to them were read; the convention should judge what consideration they require. He moved to amend that that paper which was in the hands of the chairman of the committee be read prior to any action.

Mr. Gallagher—The Committee on Credentials have no power to take any other action than they have taken. We have no power to accept a man unless he is returned as a delegate by a local association.

Mr. Davlin—Do I understand that the Chairman of the Committee on Credentials was mistaken when he said he held in his hand a paper that was pertinent to that committee for action?

Mr. Gallagher—It is a letter written by a man who claims to be a representative to this National Association, although he is not returned by his local association. The president of the local association says he was not elected as a representative; therefore the Committee on Credentials could have taken no other action than what they did take.

The report was unanimously adopted.

The President—Now, gentlemen, we are ready for business. Also, each gentleman who may have something to say on the subjects that are brought before you, will please announce his name and the place from which he came. This will facilitate business. I will not detain you further, but will simply call for the report of the secretary.

Now followed an animated debate on the question whether reports from officers should first be received, or the Constitution prepared by the Chicago Association be adopted. This association had been assigned the drafting of a constitution at the New York meeting, in June, 1883, and had sent copies to the associations, several of which had approved it. The Chicago Association was therefore ready to report.

Mr. Low, of New York—I wish to call attention to the report of a committee that is of paramount importance to this National Association. All who were present at the National Convention in the city of New York remember that there was a committee appointed consisting of T. C. Boyd, Robert Griffith, and J. J. Hamblin, of Chicago, to draw up a constitution and by-laws for this National Association. As a foundation for our proceedings I move that we now hear the report of the Committee on Constitution and By-laws, as I understand it has the rules and regulations to govern this second National Convention.

The motion was seconded.

Mr. Cunningham, of New York—I move as an amendment that the report of the Committee on Constitution and By-laws be laid over until after the report of the officers has been received.

The amendment was seconded.

Mr. Davlin, of Boston—Why not send the report to the desk with other matters and have it read? We need rules and regulations, of course. We can adopt them here and now. It needs no formal action to bring the matter up, in my opinion. We are not here to split parliamentary hairs or straws. We are here for a certain purpose, and the quicker, and clearer, and steadier we can accomplish that purpose, the better it will be for us individually and collectively. Let us have the report of this committee that has been in existence for twelve months, and if we see fit to adopt the constitution and by-laws that they present, let us do it and proceed with our business.

Mr. Low—I am sorry that Mr. Davlin forgets that the reports of the local associations have been called for and received by this committee. The object of my motion was to lay the foundation for us to get home as quick as we can. I am for expediting business. We want to put the ground-work down. And I think it will be eminently germane to

the subject to pass the original motion without amendment, so as to expedite business and permit us to scatter to our several places of abode.

Mr. Weldon, of Pittsburg—The first course is usually to elect officers, and afterward to adopt a constitution. We have been acting under a constitution for the past year; we are simply settling up the affairs of the past year. The adoption of a new constitution, under new officers, will certainly be new business. At present we are acting under the old constitution.

Mr. Cunningham, of New York—The report of the officers is simply formal, and no action is to follow that will detain the convention any length of time, whereas, the new constitution and by-laws will be a matter for considerable discussion, and it may take all the afternoon to dispose of it. It is therefore with a view of expediting business that I offer the amendment to hear the report of the officers first.

Mr. Young, of Chicago—As the new constitution and by-laws have been ratified and approved by a majority of the local associations, I cannot see how you can expedite business in any better manner than by the adoption of that constitution and by-laws as approved by the local association. Under what rules are we working now? Are they legal? Who can answer me? If we lay this matter aside are our rules legal? We should adopt a constitution and by-laws. The work we do under the old system may be entirely wrong. I am in favor of settling this matter now in order to expedite business.

Mr. Low's motion was carried, the amendment having been rejected.

Mr. T. C. Boyd, of Chicago, then read the following report:

CHICAGO, June 25, 1884.

To the Honorable, the President and Members of the National Master Plumbers' Association of the United States of America.

GENTLEMEN: Your committee, to whom was referred the National Constitution, By-laws, and Rules of Order, beg leave to report and recommend the following Constitution. Your committee would further report that they had the Constitution, By-laws, and Rules of Order printed, and sent to all the local associations of master plumbers who composed the last convention at New York City, June, 1883, with the following communication:

42 DEARBORN STREET,)
CHICAGO, December 8, 1883. }

[The communication requested the local associations to return the copies of the constitution with their approval or amendments.]

In reply to your committee's communication the following local associations have returned their approval of the national constitution, by-laws, and rules of order as a whole without amendments: New York City, N. Y.; Chicago, Ill.; Norfolk, Va.; New Haven, Conn.; Baltimore, Md.; Cleveland, O.; Cincinnati, O.; Providence, R. I.; Washington, D. C.; Boston, Mass.; Detroit, Mich.; Johnstown, Pa.

[Brooklyn, N. Y., reported them back with amendments.]

Your committee have a request from a delegation of gentlemen from Chicago, who will explain their reasons, and are now present in your city; the request is to have this society named the Master Plumbers' and the Master Gas-Fitters' Association of the United States of America.

Your committee feel under great obligations to all the local associations throughout the States for the indulgence and courtesy shown them. To New York and Cincinnati especially your committee feel under double obligations for their high praise of our work, and we desire to assure one and all that the committee in their efforts have acted in a conscientious manner throughout; and if we did not answer all communications, or if we have made mistakes, or seemingly neglected our duty, it was not done through any premeditation or consultation of others.

Your committee have been free from any and all outside influences in the production of this, their work; not even our own association of Chicago interfered in the least with the duty of your committee; but if we have made mistakes we can honestly again assert it was an error of the head, but not of the heart.

With the thanks and sincere well wishes of your committee for this grand National Association and the plumbing trade of the United States of America, also for the honor conferred in making us your committee, we beg leave to report.

Signed,
T. C. BOYD, ROBERT GRIFFITH, JOHN J. HAMBLIN,
Committee.

Mr. Low, of New York, moved that the report of the Committee on Constitution and By-Laws be received and placed on file.

Mr. Young, of Chicago, amended that they be adopted as read.

Mr. Birkett, of Brooklyn, offered an amendment to the amendment that the constitution and by-laws be read and action taken section by section. "As they read now," he said, "your president is made a figurehead. It puts the executive power in the hands of a committee, and your president cannot take care of the treasury."

Mr. Cunningham—This report is very incomplete, as every gentleman will observe in looking it over. My motion is that the report of the Committee on Constitution and By-Laws be referred to a special committee of five elected

by this convention to revise the same and present it to this convention at a later hour.

Mr. Phillips, of Providence—I rise to a point of order.

Mr. Cunningham—I claim that my amendment takes the precedence. It was offered in writing before the other.

Mr. Phillips—I move that the report of the committee be received.

Mr. Birkett—I withdraw my amendment to the amendment so as to allow Mr. Cunningham's motion to come in here.

The President—Mr. Cunningham moves that the report be referred to a special committee of five to revise it and report to the convention.

Mr. McCoach, of Philadelphia, hoped that the motion would not prevail. "This committee has brought in as complete a report as any committee you could name. Take the by-laws as presented from the hands of this committee after they have been working faithfully at them for a year. Turn them over to a special committee, and when that special committee reports we will have to take them up section by section then. I hope the substitute will be voted down and we will go right to work. Each member then can make his amendments to the by-laws as presented right in the association. If you are going to refer them to a committee I think courtesy demands that they be referred to the committee that got them up."

Mr. Cunningham, of New York—The gentleman says that this is a complete document. I wish to dispute that point, and I wish to call his attention in doing so to the very first article printed therein. It shows the mark of defacement by interlineation.

Mr. Low—I rise to a point of order.

The President—State your point of order.

Mr. Low—This gentleman has come from the city of New York. As a member of the association there he has ratified and passed upon the constitution and by-laws which this committee has just read. I hope it is not competent to entertain a motion of that character from any delegate in the city of New York, because they have approved of it by their local association already.

Mr. Cunningham—I insist that the gentleman shall not make a speech on his point of order.

The President declared the point of order not well taken.

Mr. Cunningham—I think it would be a great mistake if we should allow such a document as this to go before the country as emanating from the National Convention. I do not find any particular fault with the committee. I think that that committee is a local committee from one section of the country, and that a committee to frame a constitution such as we should adopt should be selected from all parts of the country, and not from one particular city. Such is my idea of a constitution and by-laws. There is hardly an article in that constitution which is not defaced in some manner. I think it would be an utter impossibility to print a complete book from them. They have more than two articles presented in that report which are so badly mixed up that I do not believe there is a gentleman in this hall who could call it a complete document. I hope it will be referred to a competent committee of five.

Mr. Boyd, of Chicago—I just want to say a word on Mr. Cunningham's remarks. Mr. Cunningham attacks this report of your committee as scratched from beginning to end. There is one scratch on the first page, one on page 12, and one on page 22. That is the scratching, and there is no other. Ever since December 8, 1883, Mr. Cunningham has had a chance to fetch in a complete report—a report that will beat this. (To Mr. Cunningham.) Why did you not do it?

Mr. Cunningham—I was not appointed for that purpose.

Mr. Boyd—Have you got one? Produce one.

Mr. McCoach, of Philadelphia—Mr. Cunningham's idea of a constitution and by-laws is just exactly like mine. The only point I object to is the appointment of a special committee. I think it would be a sad calamity if the National Association should fail to take them up section by section and adopt them now. I think the Committee on Constitution and By-Laws did their work excellently. They have brought in a report which is as good as any other committee could have made. Now we have got the outline, and we can fix them up in our organization with the whole union represented. It would not be represented in a committee of five.

Mr. Low withdrew his original motion in favor of the motion of Mr. Young, of Chicago.

Mr. Cunningham—I make the point of order that it is out of order to withdraw such a motion as that.

The President—If there is no objection—

Mr. Cunningham—I object.

The President (to Mr. Cunningham)—Will you state the ground of your objection?

Mr. Cunningham—I do not desire to press it.

The President—If there is no objection the gentleman will be permitted to withdraw his motion. The question now refers upon the motion offered by Mr. Young, of Chicago, that the report be adopted as read.

Mr. Collins, of St. Louis—That document which purports to have come from Chicago was received in St. Louis. I know very well that it had little or no attention paid to it at the time, as it was then announced that this matter would be brought up and acted on *seriatim* in this convention, and I am here prepared to act on it in that way. If Mr. Birkett has withdrawn his motion I will renew it in the same spirit.

The President—The motion was in the possession of the association, and was withdrawn without objection.

Mr. Collins—I think the chairman can see very well, from the feeling exhibited, that it is the wish of all the members here that this thing be acted upon *seriatim*, and that this assemblage should act on it, not a committee.

The President—The President desires to act in accordance with the wishes of the association, but the action of the association up to the present time places the chair under the necessity of putting the motion of Mr. Young.

Mr. Cunningham—I make the point of order that my substitute is before the house, and takes preference over all other motions.

The President—The President may be in error, but his decision is that the substitute has already been voted upon.

Mr. Cunningham—There has been no vote taken.

The President (to the secretary)—How is the record?

The Secretary—The question has not been voted upon.

Mr. Mead, of New York—I was one of a party who went through the constitution and by-laws with the New York members, and acted as the chairman of that committee, and after making many minutes of alteration upon the margin, and then going over it again repeatedly, I was forced to the conclusion that I could suggest nothing better. You have the framework here to work from, and if you find from year to year that there are sections you desire to change and improve, you have the opportunity of doing it. This is simply a foundation to start upon. If you take it up section by section, my honest impression is that you will be in this room until to-morrow night at this time; but it is our duty to see that justice is done to this committee who have been working one year. I trust that the motion will prevail to adopt the constitution and by-laws.

Mr. Hannan, of Washington—I think we had better adopt this constitution to-night, just as it is, and proceed in the regular way with our order of business, and then afterward appoint a Committee on Constitution. But to go into this thing section by section will be too much of a task.

Mr. Weaver, of Philadelphia—I would move as an amendment to the substitute that the constitution be read section by section, and if no amendment is offered each section shall be adopted as read. It seems to me we might adopt our constitution and have something to work under.

Mr. Byrne, of New York—I want to enter a protest here against a constitution that is made for a local organization instead of one that is made for a country with 3,000,000 square miles of territory. I stand here as a member of the New York Association, as a delegate, and as a member of the National Organization, as well as an individual to protest against your action. We do not want all the preamble and things that this document contains. We want a simple document, similar to the Constitution of the United States. If you adopt this constitution and by-laws as they now stand you simply adopt the constitution and by-laws fit for a local organization, and not at all fit for a national organization.

Mr. Boyd, of Chicago—Your local organizations in this country have had this constitution and by-laws before them during this past year—every one of them. New York has had it in its possession during the past year; Providence has had it, and the gentleman from St. Louis has had it.

Mr. Collins—And he has told you how he had it, too.

Mr. Boyd—He did not answer it properly. He answered with discourtesy. He ought to act with courtesy toward the gentlemen upon the committee, because they were appointed by the National Association and acted for the National Association. I insist upon the motion of Mr. Young being put before this house and acted upon at once, so that we may attend to other business.

Mr. Byrne, of New York—I want to ask Mr. Young, as President of the Chicago Society, or I will ask generally, if there is any gentleman in this convention who is prepared to take the presidency of the association under this constitution?

Mr. Davlin thought the constitution presented by Chicago contained the germ of all that was necessary for the proper guidance of the convention. "If gentlemen are hypercritical about the language of the different sections, adopt the rules of order and refer back the constitution and by-laws to the committee and let us go on with our business, and then we can go home feeling that we have done our work just as well as though we staid here and adopted the constitution and by-laws in the incipency of the proceedings. I claim no special knowledge, but it does appear to me that we might divide this question. We might adopt the rules of order and refer the other matter back to the committee separately for such alterations as may be required."

Mr. Macdonald, of New York—We have had a protest sent to the committee in charge of the by-laws from one of the largest organizations in the United States [Brooklyn]. I do not see one single acknowledgement given to that association—one single amendment that that association asked placed on record in these by-laws. That association, we well know, represents almost one-half of the plumbers of the United States, and yet you tell me that the Brooklyn Association should not have a voice in this matter? Should not Brooklyn have a say? Should we override Brooklyn in the matter? No. I say we should not override any association, but take these by-laws and adopt them section by section, by a vote of this convention here to-day. In looking over these rules that have been made for this association, I see cases of conflict; rules that conflict with each other. [Cries of "point them out."] No, gentlemen, I cannot point

them out until you give me the right to do so. I want the right to do so. I want Brooklyn to come here before this convention and give her objections to this constitution and by-laws. If we are to allow a small representation of the United States to decide what the others shall do, I do not think that is right and just. We want what is right and just.

Mr. Blackshaw, of Jersey City, said that Art. 13 would only give Jersey City one vote. "We do not consider that enough. According to that section there will be one vote for every hundred members or fraction thereof in the State of New Jersey. We may be fifty years older than we are now before we will have a hundred boss plumbers in the State of New Jersey. We merely have one vote, and it would not be worth while for us to come and cast it."

Mr. Low, of New York—Why did not the members of these local associations find out these defects and discrepancies? Why? Mr. President, I want to ask if the majority rules. That is what we want to know. Of all the associations in affiliation with this National Association there has only been one association that has brought two or three amendments to this constitution and by-laws. There has been a framework and a groundwork promulgated by the committee from Chicago, and if these gentlemen would stay for two weeks on these constitution and by-laws I question very much if they would produce or evolve out of their intellectuality anything that can surpass what has been presented by the Chicago committee.

Mr. Wilson, of Baltimore—As a member of the Baltimore association I voted for the constitution and by-laws when they came on from Chicago, having no idea but that they would be brought up here section by section.

The President then put the substitute, which was that the report of the Committee on Constitution and By-Laws be referred to a special committee of five to be selected by the convention.

The substitute was lost.

Mr. Lyons, of Brooklyn, offered an amendment that the amendments offered by the Brooklyn society to the constitution be voted upon separately.

The motion was seconded.

Mr. McCoach, of Philadelphia, made the point of order that Mr. Lyons' motion could not be put until Mr. Young's motion had been acted on. After much debate the president decided that Mr. Lyons' motion was in order.

Mr. Trainor, of Baltimore—I think that this convention is as competent to go over this constitution as any other convention you will ever get together. I think it will be the duty and the part of wisdom for this convention to vote upon this matter and settle it, and then take up this constitution and pass it section by section. I think the gentlemen from Chicago have done as well as any other committee could possibly with that object, but at the same time I do not think that the gentleman can expect all the associations in the United States put together in one to receive that work and not have the right to make suggestions. On the question whether we shall adopt it or not I think we should vote intelligently and take it up, establish a constitution and go to work under it; establish a constitution that will not have to be amended and fooled with constantly. I think that this body can settle the question within a very few moments.

The President—Mr. Lyons' motion is before the house. The motion of Mr. Lyons is that the amendments offered by the Brooklyn association be voted upon separately.

Mr. Young, of Chicago—If Mr. Lyons will listen to the reading of my motion perhaps he will be willing to withdraw his.

The President—It has been moved that the constitution be read section by section, and if no amendment is offered to each section as it is read, the same shall be considered adopted.

Mr. Lyons—I will accept that motion provided that when we come to the sections which the Brooklyn society have amended their amendments will be produced.

Mr. Weldon, of Pittsburg, desired to postpone action on the constitution until the following day.

The proposition did not meet with favor.

Mr. Murray, of Chicago—On page 12 we have Art. 15, which says that all amendments to the constitution and by-laws shall be proposed in writing at an annual meeting of the association, and a two-thirds majority shall be required for their adoption. Why not adopt the thing as you have it here, and immediately go to your homes or hotels, make your amendments, and bring them here to-morrow?

This was objected to by cries from different parts of the house.

Mr. Mead, of New York, asked whether a majority of the associations passed upon the constitution and by-laws.

Mr. Boyd—I have the original papers that came back from thirteen out of twenty local associations that composed the last National Convention, approving of them as a whole, with the exception of Brooklyn, that I read before the association to-day—New York, that has kicked so vigorously here to-day, Philadelphia, that I have not heard from, and St. Louis. New York gave your committee the highest praise of any local association of the United States on their work as to this constitution and by-laws.

Mr. Cunningham said that the motion to adopt the constitution in the New York association was passed at the smallest meeting ever held by that association.

Mr. Collins, of St. Louis, said that it was understood by the St. Louis association that the constitution and by-laws would be taken up *seriatim* in Baltimore, and that the majority would rule. "Chicago or New York cannot rule us. Look at the seats they have given us here! We are not going to take such a position, and allow Chicago, New York, Boston, and Philadelphia to put us down. We came here to take up the by-laws *seriatim*."

Mr. Remick, of Philadelphia, said that the constitution and by-laws came at such a late hour that the association never had a chance to act upon them as an association. They were referred to a committee of that association, and for want of time we have never had a report of that committee to our association, and they have never been acted upon.

The previous question was called for.

Mr. McCoach, of Philadelphia (being allowed the floor)—I understand the constitution and by-laws were presented to the local organizations and read; but the local organizations have no right, as local organizations, to make laws for this body. The local organizations have no right whatever to say whether they are to be adopted as the laws of the national organization or not. We are here to make our own laws.

The President—The question before the convention is whether the constitution shall be read section by section and amendments voted upon as they are offered.

The motion that the constitution should be read section by section, and amendments voted upon as they were read, was then put and carried unanimously.

A motion by Mr. McCoach, amended by Mr. Foster, was then carried, that no member be allowed to speak more than five minutes, nor more than once, on any subject, except by permission of the house, nor more than twice under any circumstances.

Mr. Macdonald, of New York, claimed that that delegation was entitled to vote on the basis of the full membership (24 votes), and not only on that of the number of delegates present.

The chair ruled that they could vote only on the basis of the actual number present.

Mr. Macdonald appealed to the convention.

The convention sustained the chair.

A motion by Mr. Tierney, of Providence, that amendments to be offered to the constitution should be specified by the chairman of the delegations was lost.

The discussion of the constitution was then begun.

Mr. Harkness, of Philadelphia, amended, making the title National Association of Master Plumbers of the United States of America.

Mr. Young, of Chicago, proposed to substitute National Association of Plumbers and Gas-Fitters of the United States.

Mr. Finerty, of Boston—I have come on here from Boston not to represent any gas-fitting concern or gas-fitter. I hope and trust that the clause "gas-fitters" will be excluded from that motion.

Mr. Young's substitute was decisively voted down.

Mr. Lyons, of Brooklyn, proposed an amendment making the title "National Association of American Plumbers."

Mr. Lyons' amendment was lost.

Mr. Harkness' amendment, that the association should be known as the National Association of Master Plumbers of the United States of America, was then adopted.

Section II., declaring the principle on the association to be that "plumbing is a science," and that it is one of the finest mechanical arts, and is conducive to the health of mankind, was rejected.

The convention then proceeded to pass upon the remaining sections of the constitution, by-laws, and rules of order, and after various amendments adopted the constitution, by-laws, and rules of order as amended, and at 7.45 P. M. adjourned until the following day at 9 o'clock.*

THURSDAY—SECOND DAY.

On assembling at 9.30 A. M., the president announced that the Baltimore delegation had invited the members of the convention to visit the Baltimore Water-Works that afternoon.

The president then announcing that the reading of the essays on the subjects appointed at the New York meeting was the next thing in order, after some little debate in favor of simple publication, without reading, in the journals and in the report of the doings of the convention, it was decided they should be read in convention. [Abstracts of several essays will be given in later issues.]

On the completion of the reading of the essay from Hudson County, a portion of the convention was evidently dissatisfied at the delay of business, and a motion was put and seconded to suspend further reading. The motion was, however, lost, Mr. Collins, of St. Louis, coming to the rescue of the essayists, and the reading continued. Several of the essays were heard with great interest. Philadelphia's especially caught the ear of the convention, and the reading was interrupted with cheers. Boston's found great favor, and Chicago's, and Cincinnati's were also of much

* We shall print the full text of the Constitution, as adopted, hereafter.

interest. New York presented none on the subject assigned her, "The Saturday Half-Holiday," as the strike and lockout now in progress prevented its preparation.

The thanks of the convention were tendered for the essays.

Mr. J. J. Wade, of Chicago, submitted the following resolution:

Resolved, That it is the sense of the Master Plumbers' Association of the United States that every aid and assistance be extended to the disfranchised master plumbers of the District of Columbia, and that we, through our representatives at Washington, give them such legislation as will place them upon an equal footing with the master plumbers throughout the United States.

Mr. Wade also presented the following "Amendment to the Act Governing Plumbing Regulations in the District of Columbia." There shall be appointed by the Commissioners of the District one inspector of plumbing and two assistant inspectors, who shall be thoroughly practical plumbers, and who, before having been appointed, shall pass an examination before a committee, said committee consisting of one member of the Journeymen Plumbers' Association and one sanitary engineer appointed by the Commissioners of the District; and that no person shall be registered to carry on the plumbing business before having passed an examination by the above committee; also that the salary of the inspector shall be \$2,000 per annum, and the salary of the assistants to be \$1,200 per annum.

Washington, through Mr. E. J. Hannan, made earnest advocacy for the passage of this resolution, and indorsement of this amended bill. Mr. Hannan asserted that Mr. Ingalls, Chairman of the Senate Committee on the District of Columbia, had promised the Washington Association a hearing, but afterward a hearing had been given to the Commissioners of the District. A bill providing for an inspector and one assistant, without specifying of what profession they should be, had passed the Senate and was before the House. A conference had been appointed by the House, and the Washington Association hoped to get the indorsement of their fellows, and secure the adoption of their amended bill. They regarded the compensation of the chief inspector as inadequate, and the inspection a farce.

On motion of Mr. Birkett the convention came unanimously to the support of the Washington brothers, and decided that the officers of the National Association, and every member of the convention, should sign the resolution, and then the convention unanimously recommended to Congress the passage of the amended bill proposed by Washington.

There now followed the report of the Executive Committee, of which the important parts were as follows:

Among the more prominent duties assumed by the committee, the following may be briefly enumerated: First, the furtherance and establishment of legitimate basis of trade protection, as between the plumber, the manufacturer, dealer, and the customer. Second, The increase and encouragement of associations of master plumbers in every place practicable throughout the United States. Third, The maintenance of the authority and integrity of the National Association, in order to enable it to fulfill its appointed work in a complete and satisfactory manner.

Under the first head, trade protection, it may be observed that measures were adopted at our earlier meetings to bring about a conference between the committee and manufacturers and dealers in plumbers' materials of New York City alone. It was deemed impracticable to take a wider range than this for obvious reasons. The Executive Committee are desirous of recording their approval of the evident desire for making reasonable concessions, and introducing the needed reform in the plumbing business, with which they were met by a similar committee appointed by the manufacturers and dealers. This committee represented every branch of manufactured goods used in the plumbing business, and was chosen with great care. A series of propositions were submitted, covering the points considered of importance, and were the result of careful advisement from various sources. The Manufacturers' Committee considered them, however, too sweeping, and tending to defeat themselves, as it were, by alienating public opinion and provoking hostile measures, and substituted the following: "After careful consideration of the circular relating to matter of protection, submitted to us by the Executive Committee of the National Association of Master Plumbers, the following was unanimously adopted: That, after due consideration, we, the Committee of Manufacturers and Dealers in Plumbing Material, do not think it best for the interests of the plumbing trade generally that any rigid or specific agreement should be entered into whereby the plumbing trade is to be afforded special protection, and the general public excluded from inquiry or interest in the goods made or sold by us. Furthermore, while this is our judgment, we at the same time fully appreciate the fact that our interests are mutual. We are always willing to treat the plumber fairly, and will supply him on terms that are distinctly trade as compared with prices charged consumers; and, in substitution of Articles I., II., III. of the proposition, we agree to the following: That manufacturers and dealers in plumbing material henceforth shall

not sell to others than plumbers regularly engaged in the business, public institutions, corporations, and parties employing their own plumbers, except at a reasonable advance on the wholesale price to plumbers, and that no manufacturer or dealer shall estimate on plans or specifications, or give lump-prices for goods to any person, whether engaged in the business or not. Having carefully digested your circular, the publicity given to it through the daily press, and otherwise, which we believe to be detrimental to your interests and also to ourselves, being so closely allied to you, we would most respectfully suggest, for the good of the trade and in the interest of harmony, that when a complaint is made against any dealer it should be thoroughly investigated by such a committee as you may appoint, and where it is found to be true, you can bring it up before your association, and the remedy for which will clearly suggest itself to you, and be in your hands. Very respectfully, John Reed, Chairman of Committee, for J. L. Mott Iron Works; Fred. Adey; John D. Fraser, for Abendroth Bros.; Henry Steeger; George A. Wood, for Waefeler & Wood; George Lane, for Meyer & Lane; E. B. Wood, for Colville Lead Manufacturing Co.; Henry Huber; Samuel F. Sniffen, Secretary, for The Meyer-Sniffen Co."

This agreement was discussed at much length by the Executive Committee, aided by some influential members of the New York, Brooklyn, Hudson County, and Newark, N. J., associations, with the Committee of the Manufacturers and Dealers. In order to preserve in accurate form the line of argument followed in this discussion, a stenographic report was taken, and will accompany this document. The agreement was eventually accepted as a basis on which to work until more definite and comprehensive arrangements could be made by local associations themselves, not being regarded by any means in itself as a finality. It was distinctly recognized that, taking into consideration the widespread and complex conditions under which the numerous associations existed, nothing definite could or ought to be laid down, and it was therefore deemed expedient to accept it as a starting point, subject to the safeguards contained in the final clause of the agreement. This clause emphasizes unmistakably the method by which plumbers can solve the problem of remedying their grievances, and, carried to its logical results, renders them complete masters of the situation. A forcible illustration of its efficacy in a particular instance may be cited, in which the New York Association had occasion to test the value of the "agreement," because of its violation by one of the parties to it. Although this association has not as yet secured an arrangement whereby its local interests would be protected, it availed itself of the agreement alluded to, and, with its aid and the discretion invested in it by the words, "the remedy for which will suggest itself and be in your own hands," it succeeded in compelling one of the most powerful houses in the country to recede from its indefensible position, and request a reinstatement in the good graces of the master plumbers of New York City. It is a perfectly valid inference, then, that any association sustained by the National Association through its affiliations, can compel an honest compliance with stipulations fairly entered into by the parties who make and furnish their material. Several associations, availing themselves of the action and advice of the Executive Committee, and some in advance wisely took advantage of the temper of the time and the long-wished-for opportunity. The St. Louis Association deserves the credit of being one of the first, if not the first, which manfully asserted its rights as representative business men, and introduced a radical innovation in the doubtful, though time-honored customs, in vogue among dealers, of furnishing materials to purchasers indiscriminately, regardless of their obligations to their principal customers. This will no doubt be related by the vice-president of the State of Missouri in his report, and we shall not, therefore, anticipate its nature. Many other associations, the Brooklyn, Washington, D. C., Pittsburg, Baltimore, Philadelphia, etc., have made arrangements, differing, perhaps, in detail, but satisfactory to them, in being adapted to their special requirements.

The fact, as far as the knowledge of the committee extends, is quite obvious that in no instance where an association has asserted its reasonable claims has it failed in acquiring them, and the conclusion is inevitable that this is mainly attributable to the strength inseparable from so many associations working in unison.

The formation and development of local associations in connection with the Executive Committee will next claim your attention. Although it was intended that the business should be more immediately under the direction of the State vice-presidents elected at the first convention, or appointed since by the president of the National Association, it still received from the Executive Committee all the consideration its limited time and resources permitted. The publication of the proceedings of the first convention and the National Association was largely relied on to further the work, as it contained a most interesting and graphic account of a new departure from the worn and hackneyed ways of the past, and unfolded possibilities in the future for our trade that we all have been anxiously looking forward to. This document exhibited the plumber in a triple relation—as he stands toward the public as his customers, toward the manufacturer and supplier of his material, and toward his brethren of the craft and himself. As an important factor in modern life, the plumber of to-day appears in a different light from what popular estimation and a censorious press would make him, and we trust that the hour is not far distant when he will be recognized as one possessing a higher standing in popular estimation than is accorded to him. Our proceedings were, therefore, distributed widely and freely, and it is hoped with satisfactory results to the various associations which were or had be-

come affiliated with the National Association. The printed matter relating to the agreement entered into with the New York manufacturers and dealers was also sent to the various associations, as well as others connected with the business of the Executive Committee. In order to bring the National Association more closely in relation with the local branches, it was attempted, and in many instances with success, to induce the latter to send a full roll of officers and members, and afterward a monthly report of the progress of the association, with such details or other information as might suggest itself to the secretary. It is to be regretted that the efforts made in this direction were not wholly responded to. Many of the associations paid no attention whatever to the matter, although the necessary blanks were furnished. It is satisfactory to be able to say that this negligence was not universal, as many of the associations forwarded their reports with regularity, and the returns form quite an interesting record of their history for the year, as well as attesting their loyalty to and harmony with the National Association. A large amount of correspondence necessarily accompanied the work of the Executive Committee, which was performed as best it could under the disadvantage of time, already abundantly preoccupied. It may not be out of place here to suggest that, judging from the experience of the year just elapsed, the duties of the secretary of an association of such magnitude should be discharged by one whose whole time and undivided attention can be devoted to it. This is impressed on us by the reiterated tenor of numerous letters inculcating the fact while asking for advice and direction, and the opinion seems to be prevalent that no reasonable expense should be spared to insure the vigorous and sustained action of the Executive Committee through its officers.

In approaching the third part of this report, the upholding of the authority and integrity of the National Association, a subject presents itself which, through a want of thorough understanding of the questions involved, led to widespread and very contradictory comment. Through the desire of the Executive Committee to avoid anything calculated to injure its influence during the progress of the work confided to its charge, it was decided to ignore all attempts to divert its attention from its specific duties. Unfortunately its reserved and passive attitude was misconstrued and misrepresented, until finally it became a necessity to set itself right and disseminate the facts in regard to the untenable claim of an ex-member of the committee.

The peculiar circumstances attached to this matter have been already laid before you in a circular addressed to the various associations, and with such results that it is gratifying to be able to state that the responses from all quarters show that all doubt has been removed from the minds of our fellow members, with perhaps some unimportant exceptions. A brief review in regard to this matter may make it perfectly clear. Mr. A. Mead, of New York City, was elected a member of the Executive Committee at the previous convention. Not fully apprehending, it is charitable to suppose, the composition of the committee as laid down in the constitution, he claimed to be its chairman. This claim the committee were not prepared to admit, and firmly declined to allow it. In this view of the case they are sustained by the parliamentary law, that all committees have an incontestable right to elect their chairman; *vide* Cushing's Manual, Rule 273, Jefferson Parliamentary Manual. The result was the resignation of Mr. Mead from the committee. A different reason has lately been assigned for his withdrawal—namely, that his personal dignity was concerned. The occasion for this was his efforts to intrude on the functions of another officer of the committee, which were promptly repelled. Mr. Mead's place on the Executive Committee was filled by the election of Vice-President J. W. Birkett of Brooklyn at a special meeting called for that purpose on the 22d of August. After a lapse of several months he reasserts his claim in the press, denies that he ever resigned, renews the agitation, and announces himself Chairman of the Executive Committee, headquarters, his shop on Sixth Avenue. The absurdity of the gentleman's position will be understood at a glance, when it is remembered that no other member of the committee recognizes his claim. His pretensions in the city of New York was easily enough exposed, and his power for harm therefore limited, but at a distance this was most difficult, and it therefore became the duty of the Executive Committee to lay aside its reserve even at the risk of some loss of self-respect and dignity.

Here follows a table showing the present local associations which have affiliated with the National Association. They are 39 in number.

The report is signed by George D. Scott, President N. A. M. P., U. S., and Edward Murphy, Secretary.

Before the question on the adoption of the report was put, Mr. Mead, of New York, desired also to make a report of the work of the Executive Committee.

Mr. Collins, of St. Louis, moved that the report be made. The President—The gentleman is out of order. The question is upon the adoption of the report which has just been read.

The report of the Executive Committee was adopted and ordered filed.

The President—The next in order is the report of the Financial Secretary.

The Financial Secretary, Mr. Remick, reported that \$1,340 had been received from local associations and turned over to the Treasurer.

The report of the Financial Secretary was received and ordered filed.

The Treasurer, Mr. M. J. Lyons, reported disbursements, \$964.11; receipts, \$1,346.12; balance, \$376.01.

The report of the Treasurer was accepted and filed.

It was then announced amid applause that Mr. Murphy, Secretary, had declined to accept any compensation for his services.

Then Mr. Thomas Hudson, of Brooklyn, offered the following resolution: *Resolved*, That the chairman of each delegation be requested to wire their members that they support the amendments which will be sent by mail through the master plumbers at Washington.

The convention adopted it, and adjourned to 2.30 P. M.

On reassembling after the recess a warm and interesting debate, into which Davlin of Boston, Mitchell of New York, and others injected considerable humor, was precipitated upon the convention by the ardor of St. Louis.

It was upon the presentation of the reports of State vice-presidents, and St. Louis led the line. Conscious of energetic endeavors in the interest of protection, St. Louis desired to present all the details of her labors to the convention, and Mr. Graham proposed to start in with the reading of letters from dealers and manufacturers who had met the wishes of the St. Louis men in the matter of selling only to plumbers.

Mr. Davlin, of Boston, thought they had better dispense with the reading of the reports of the vice-presidents, and use the time in the transaction of other business. "The reports were legitimately the property of the convention and could be read at their homes under the shade of their own vines and fig-trees."

Mr. Weldon, of Pittsburg, did not think it advisable to publish the fact that some manufacturers were favorable and others not.

The president stated that Mr. Graham was desirous of presenting his report.

Mr. Cunningham, of New York, then read the first of the communications from the dealers, which made a part of St. Louis' report.

On the reading of this letter several protests were made by delegates who opposed making public what action individual firms were taking. Some delegates thought the reading of the letters were first-rate advertisements of the dealers. It was proposed to go into executive session on the reports and exclude all except the accredited members of the convention. But finally the convention decided the report should be presented, letters and all, and it was so read. We give extracts from the debate, as they well show the play of feeling on this matter.

Mr. Davlin—It seems to me that it is no part of the duty, and could not be a part of the duty of any vice-president to make such communications a part of his report. This is a matter pertaining to a local organization and not to the State vice-presidency at all. I move that all of this report pertaining to the agreements entered into with the dealers be eliminated, and the report confined simply and solely to the efforts, labors, and successes of the vice-president in the proper fulfillment of the duties assigned him.

Mr. Weldon, Pittsburg—Pittsburg has a similar paper to that, and we desire to go further, but we do not wish our report printed in connection with the proceedings of this association.

Mr. Davlin—Mr. President, I move we go into executive session, and then no man will be allowed to remain with us who will be likely to make a record.

Mr. McCoach objected to executive session at that time. He did not think the letters had anything to do with the National Association and they should not be printed in the proceedings.

Mr. Macdonald, of New York—I do not think it right for the vice-presidents to incorporate in their reports their correspondence with the dealers.

The motion to go into executive session was lost.

Mr. Young, Chicago—If the delegates knew the amount of work performed by the State vice-presidents they would demand that those vice-presidents should make their reports here, as proposed. I can assure you that Mr. Graham has accomplished a great work in the section of country he comes from.

The President—There appears to be objection only with reference to any agreement entered into.

Mr. Collins, St. Louis—I should be very sorry, Mr. President, at this stage, if the report cannot be read. It was asserted nearly one year ago that the agreement entered into between the supply houses and the Master Plumbers' Association of St. Louis would not last six months—nay, three weeks. We come here now, gentlemen, after one year, and we wish to impress upon you that we stand here to-day a hundredfold more highly in the appreciation of our supply-men than we did a year ago. Again, we want to show you that we have not a single black sheep in the city of St. Louis.

Mr. Finerty, of Boston—I do not think this is a proper place in which to disclose the agreements that have been made by the different associations throughout the country.

Mr. Davlin—I claim that there are certain people who are not entitled to stand here, and I do not believe that it is right that these agreements should be read and spread broadcast, because the dealers in different localities will be apt to make those comparisons which are always thought to be odious. Do not give the information to Tom, Dick, and Harry, who have not raised a finger in this grand work.

Mr. Mitchell, of New York—In the early part of the convention I was in favor of submitting the essays to the

press. I believe the emergencies, and exigencies, and opportunities of this meeting are so urgent and so positive that we should go on and expedite and bring the proceedings to a close.

Mr. Weldon, of Pittsburg—Making public is what I objected to. Suppose we have made certain terms with our dealers, they would say, "these are better terms than many other supply-men have given in various localities. We desire to know what St. Louis has made; we desire to know whether our terms are as good as others; if not, we will try to bring them up to their standard."

A Boston delegate moved that the convention go into executive session for two hours, and that all persons not delegates leave the room until after that time.

The motion was lost.

Mr. Gallagher (St. Louis)—St. Louis is not, I suppose, particularly desirous of reading those reports for its own aggrandizement. We want to show how we did it, in order that other delegations may go and do likewise, if they so desire. It does not matter whether they are read or not; we do not claim any great credit, but that is about how we stand in the matter.

Other letters were then read.

A New York Delegate—Mr. Chairman, doesn't it look like a first-class advertisement for the St. Louis manufacturers? I get letters like that every day of the week.

The President—We are almost to the end of the report, and it will only take a minute to finish.

A New York Delegate—I say it is a first-class advertisement. I didn't come here to listen to advertisements read.

The President—The gentleman will come to order.

Mr. Cunningham then read the other letters submitted by Mr. Graham.

The subject-matter of these letters related to agreements with the St. Louis Association to sell to none but members of the association, and to correspondence over an editorial in THE SANITARY ENGINEER of September 27, 1883.

The vice-president's report for New York was then presented by Mr. Birkett, of Brooklyn.

The secretary then read the report of the Massachusetts vice-president, Mr. James Tucker.

[The reports of the vice-presidents will be noticed hereafter.]

The reference in Mr. Tucker's and Mr. Birkett's reports to obstacles put in their way by Mr. Mead gave him the opportunity to again ask for the admission of his report as Chairman of the Executive Committee. Probably the presentation of this issue had been awaited with as much interest as any other matter by the delegates, and the feeling it elicited showed the concern New York, at least, took in it. Mr. Mead's request instantly raised hot protest from New York. The president refused to recognize Mr. Mead as a member of the committee. The feeling of the convention at large was divided between the desire to hear both sides of the dispute, and a wish to choke off a discussion which might be injurious to the National Association, and for a short time a raging storm seemed about to burst. But better counsels prevailed at last, the dispute was referred to a committee from every delegation, and the result left the convention entirely harmonious. The principal issue raised in the debate was the force of Mr. Mead's resignation as invalidating his claim to be either chairman or member of the Executive Committee. That it did so invalidate was urged by President Scott, who, it should be stated, presided with fairness during the heated discussion, by Mr. Mitchell, of New York, who was the bitterest opponent of Mr. Mead, and by Mr. Reynolds, also of New York. Mr. Mead claimed that the letter was not intended as a resignation. He claimed that if it were taken in connection with a conversation at a meeting of the Executive Committee at which the trouble began it would be construed differently. Mr. Mead further claimed to have a right to present a report upon the work of the committee up to the time at which he had resigned. The letter in question, dated August 9, 1883, addressed to George D. Scott, President of the Master Plumbers' National Association, was read. In it Mr. Mead says that his intention to resign could not be made plainer than it had been in the presence of the committee. His present intention was "never to lose another hour in matters pertaining to plumbers' associations."

Mr. Mead, after the reading, as before, still declared that the letter must be taken in connection with the circumstances occurring in the committee to be understood. Mr. Mead was championed by Mr. Low, of New York.

Outside of the New York delegation there was on the one hand a desire to have all documents and information laid before the general convention. Mr. Young, of Chicago, and Mr. McCoach, of Philadelphia, took this view. Others felt that it would be difficult for the convention at large to obtain the information to which Mr. Mead seemed to refer as throwing light on the facts, and desired to refer it to a committee. This view was maintained by Mr. Davlin, of Boston, and Mr. Gawthrop, of Wilmington,

Del. It ultimately prevailed, and a committee consisting of one member from each delegation was named by the delegations.

The committee having retired, reports from State vice-presidents, which had been interrupted by the debate on Mr. Mead's case, were resumed, and Rhode Island's was called for and presented by Mr. George R. Phillips.

Pennsylvania was unable to present a report, owing to the absence of her vice-president, Mr. H. J. Burke.

When Washington was called, Mr. Reagan explained that in the absence of Mr. Shedd, who was ill, no report was ready, but they had an agreement with the dealers in Washington and Baltimore and were getting along very well. They had the agreement presented by the dealers and accepted by them. It worked very well.

For Virginia, Mr. Foster, of Norfolk, responded orally. He reported that they had an organization in Norfolk composed now of four men. One year ago it was composed of five, but owing to the stringency of the times one had fallen by the way. The other four were determined to uphold the organization and continue their fealty to the National Association. There were two other competent, worthy men in the craft carrying on business who had not joined. The consequence was, that they (the members) had lost some of their business, especially in the gas-fitting line. Their experience had been due to the fact that the two men who would not come into the association put up the fixtures. He had corresponded with the plumbers in every city and had failed to lay the foundation for an organization. They wrote him that the people in their section were not in sympathy with trades' unions of any kind, and they were afraid to go into them. "I confess, sir, that four plumbers in my city have more independence, and were not afraid to go in. We are not afraid to stick now that we are in, and we will do all we can for the association. As I stated, last year, we required no protection in the gas-fixture business, being so remote from the centre of the trade, so far from the manufacturing districts, we had to carry stock. We buy it where we can buy it cheapest, and I expect we can buy it as cheap as those of you who have organized with protection committees. In that direction we require no protection. We are here simply because we love our trade, and we want the national organization to succeed and prosper."

Mr. Wade, of Chicago, then read a paper on protection, containing the following resolutions:

WHEREAS, The manufacturing and wholesale firms in plumbing materials persist in selling to consumers, to our injury and detriment, placing us toward our customers in the light of extortionists, causing endless trouble; and

WHEREAS, The system of protecting us from this wrong, which draws in its wake other wrongs, is ineffective, it is absolutely necessary to perfect such a system by united action, which will remove these evils from which we have suffered for years; therefore, be it

Resolved, That any firm manufacturing plumbing materials selling to others than master plumbers, that we withdraw our patronage from such firm.

Resolved, That manufacturers of gas-fixtures selling to consumers shall not receive the patronage of any master plumber.

Resolved, That the master plumbers shall demand of the manufacturers and wholesale dealers in plumbing materials to sell goods to none but master plumbers.

Resolved, That this association keep a record of all journeymen and plumbers who place in buildings plumbing material bought by consumers of manufacturers or dealers.

Resolved, That any manufacturing or wholesale dealers dealing in wrought-iron pipe, who sell to consumers, shall not receive our patronage.

Resolved, That a committee be appointed by this association in every State and county for the purpose of reporting to the proper officer at its head in the State any violation of these resolutions.

Resolved, That these measures are just and necessary to our welfare, and a rigid enforcement is demanded.

Resolved, That this convention indorse the above, and urge upon the National Association to perfect and adopt a uniform system of protection for the trade over their entire jurisdiction.

After some debate on the advisability of referring the report to the Executive Committee for report, it was finally voted to adopt it as it was in the convention.

Mr. Wade thanked the convention for its action.

Letters from Alabama, Georgia, Canada, etc., indorsing the report, will be presented to the Executive Committee.

Mr. Blackshaw, of Hudson County, New Jersey, offered a resolution that the Executive Committee of the National Association be requested to devise means whereby the members of local associations in good standing may receive a greater percentage than all others.

Mr. Blackshaw—My reason for offering that is this: It will keep the plumbers together. When the executive committee comes to make arrangements with dealers, I think it would be well to make some proviso with regard to the issue of certificates of the National Association, with the seal of the association attached and signed by the president and other officers, to be sent to the various vice-presidents of the several States and Territories, to be distributed to the local associations. The executive committee will try to make some arrangements with dealers and manufacturers for the benefit of parties having those certificates in their possession.

The resolution was adopted.

On motion of Mr. McCoach the amended constitution and by-laws were adopted.

A vote of thanks was tendered to the Baltimore delegation for promptly furnishing proof-sheets of the constitution and by-laws.

Mr. McCoach offered a resolution, which was adopted: That the recording secretary of the national organization be directed to ask the local organizations to send, immediately after the election of delegates to the National Association, the returns of such election, and that the secretary be directed to prepare a list of delegates, for use of the Committee on Credentials.

Mr. McCoach also offered a resolution, which was adopted, authorizing the Executive Committee to have a sufficient number of copies of the constitution and by-laws of the association printed to mail a copy to each member of the association.

The convention then adjourned to 9 o'clock, Friday.

THIRD DAY—FRIDAY.

The first business to be disposed of on Friday was the report of the committee on the differences between Mr. Mead and the New York Association. After long consideration in committee a decision had been reached on this question which the day previous had seemed likely to throw a fire-brand into the convention. Fortunately at this point the convention showed its good judgment by adopting the resolution submitted by the investigating committee, that its report should not be subject to debate, but should be voted on immediately.

On adoption of this resolution the president called for the presentation of the report, Mr. Allison, of Cincinnati, asking the convention to observe the wish of the committee that no demonstration of applause or displeasure should be made on its reading.

The report was then read by the secretary, as follows:

To the National Association of Master Plumbers.

GENTLEMEN: Your committee, to whom was referred the differences between Mr. A. Mead and the association, beg leave to report that they have carefully considered the same, and have decided that they cannot sustain Mr. Mead.

Signed: James Allison, Chairman; L. B. Cross, Secretary; I. K. Becker, George W. Keyser, Indianapolis; A. A. Donnelly, D. B. Foster, Baltimore, Md.; George B. Lewis, Brooklyn; Alfred Gawthrop, Wilmington, Del.; J. H. Buckley, New Haven, Conn.; William Halley, Columbus, O.; T. P. Tuite, Detroit, Mich.; W. H. Graham, St. Louis; John E. Allen, Des Moines, Iowa; William M. Wright, Philadelphia, Pa.; Daniel G. Finerty, Boston, Mass.; James J. Smith, Cleveland, O.; James L. Ryle, Kansas City, Mo.; John Mitchell, New York; George R. Phillips, Providence, R. I.; W. B. Davis, Norfolk, Va.; M. J. Duffy, Louisville, Ky.; J. S. Trimble, Wheeling, Va.; Thomas C. Boyd, Chicago, Ill.; Ed. J. Hannan, Washington, D. C.

On call for the reports from State vice-presidents, which followed, Connecticut, Maryland, and Ohio gave no response.

Michigan asked to be allowed to postpone the report until next year.

Minnesota "was in the same boat as Michigan."

Illinois reported through Mr. Young, of Chicago.

Mr. Young, in concluding the remarks with which he presented his report, requested the convention before adjourning to appoint a committee to meet the lead manufacturers, who, he understood, were about to take steps to form a national association. It was then voted to receive and accept the reports of the State vice-presidents.

The next business in order being the election of officers, the convention empowered the president to appoint tellers for ballot for president. He accordingly named Mr. Carey, of Providence, and Mr. Davlin, of Boston.

Mr. Weaver, of Philadelphia, desired to "see the organization placed in the West, that fruitful field for the benefit of plumbers," and nominated Mr. Andrew Young, of Chicago, for the office of President of the National Association.

Mr. Foster, of Norfolk, seconded, saying: "In selecting the standard-bearer for the next twelve months for this association we want a man who feels fully identified with the interests of his craft, who has the ability to carry out the mandates and wishes of the association, who has the independence and manhood to do what is right, and who will do all that can be done for the benefit of the association. Mr. Young, of Chicago, is the man, in my judgment, to carry our standard for the next twelve months."

Mr. Macdonald, as chairman of the New York delegation, said: "I should be happy to indorse the nomination, and feel that we give our hearty sympathy. I think the Western members can rely on the heavy artillery of New York to sustain any action that the Western associations shall bring forth. Although there sometimes has been the appearance of discord and fight among us, yet, let it be remembered, that we can afterward, in honor of the victory, dance and play and sing and enjoy ourselves. We can stand up for our rights, but when we come out of the fight

we will also stand shoulder to shoulder to fight the enemy. I can assure you that no matter who may be placed in nomination to-day for the different offices of the convention they shall have the hearty support of the New York delegation.

By this time the enthusiasm for a candidate from the West had seized upon the convention. Davlin, of Boston, became its spokesman, and proposed an election by acclamation. The convention seized the suggestion and put it through with a rush. The election ended in three ringing cheers for the president-elect, Andrew Young, of Chicago.

Mr. Byrne and Mr. Foster were appointed a committee to escort Mr. Young to the platform. He was received with great applause, and was introduced to the convention by Mr. Foster, who said: I come, my friends and brothers, from the extreme southeastern section, and I and my colleagues stand here to-day as the only Southern representatives of this association. We come from down in that section of the country where the salt sea waves sob themselves to sleep upon the golden sands of the Atlantic, and sing their matin songs as the great orb of day rises from his morning bath in the ocean. My brothers of the National Association, it is with unaffected pleasure that I have the honor of introducing to you a gentleman who has fully identified himself with all the true interests of our association—a gentleman who is fully capable of performing the duties of the office, a gentleman who measures up to the full standard of all that you may require of him—Mr. Andrew Young, of Chicago, your president-elect.

Mr. Young then addressed the convention, saying: I thank you kindly for the compliment you have paid the great West in selecting me to fulfill the office of president for the coming year. In doing so I hope that all the subjects of our essays may be exemplified; that that splendid paper from Baltimore, "The Unification of the Craft," may at the end of the coming year be an accomplished fact; that the objects of the National Association, as set forth by the Philadelphia delegation may be fully accomplished according to their wish and requirement, as put forth in their essay; that our apprentices, our journeymen, and our master plumbers may have all the culture as enunciated and demanded by our friend Mr. Davlin, of Boston; that our knowledge on all these subjects may be thorough and complete; that every delegate to our next annual convention may be a higher educated man than any we have here present; and that the work of education in connection with these essays and through your local associations may produce large fruit for the future. All bickerings and jealousies having now been put down we will march forward shoulder to shoulder in demand of our rights as master plumbers of the National Association.

The election of first vice-president being then in order, Mr. Sheehan, of St. Louis, nominated William H. Graham, also of St. Louis.

Mr. Byrne, of New York, seconded.

Mr. Wade, of Chicago, nominated Mr. James Allison, of Cincinnati.

Mr. Hannan, of Washington, D. C., seconded the nomination of Mr. Allison.

The nominations were then closed.

The president stated, in reply to questions, that the votes of only such delegates as were actually present could be cast by any delegation for vice-president, and if a delegation were not unanimous, any member should have his individual vote counted. If unanimous the chairman could announce the vote of the delegation.

The vote for first vice-president was then taken and resulted in the election of James Allison by 74 votes to 27 for William H. Graham.

Mr. Allison expressed his thanks.

Mr. Sullivan, of New York, nominated Alexander Murray, of Chicago, for the position of recording secretary.

Mr. Murray declined to be a candidate, and substituted the name of J. J. Wade, of Chicago.

Mr. McCoach, of Philadelphia, renominated the existing secretary, Edward Murphy, of New York.

Mr. Gallagher seconded.

Mr. Murphy declined to be a candidate, considering the place should be filled by a man from the same locality as the president.

Mr. Davlin, of Boston, moved that Mr. Wade be elected by acclamation.

Mr. Birkett suggested that the president-elect cast one ballot for Mr. Wade. The suggestion was adopted, and Mr. Wade was declared elected recording secretary, amid applause.

Mr. Mitchell, in making a nomination for treasurer, was in favor of some of the offices coming to Brooklyn and New York. In order that Brooklyn, New York, and the East might not be separated from the great West, but that they might at least participate in the great work, he nominated for the office of treasurer Mr. M. J. Lyons, of Brooklyn.

Mr. Baggott, of Chicago, nominated Mr. Graham, of St. Louis.

Mr. Davlin seconded the nomination of Mr. Graham.

Mr. Weaver, of Philadelphia, agreed with Mr. Davlin that the office of treasurer should go to the West.

The convention then elected William H. Graham, of St. Louis, to be treasurer, he receiving 80 votes and Mr. Lyons 55.

Mr. Graham's election was made unanimous on motion of Mr. Birkett, of Brooklyn.

The election of corresponding secretary being now in order, Mr. Birkett thought that that officer ought to be as near the President as possible. The President must have supervision of the communications received by the corresponding secretary. The office ought to go to Chicago.

Mr. Weaver, of Philadelphia, nominated Mr. Boyd, of Chicago.

Mr. Boyd declined.

Mr. Baggott, of Chicago, nominated Mr. Enoch Remick, of Philadelphia.

Mr. Remick declined.

Mr. Byrne, of New York, nominated Mr. Hamblin, of Chicago.

Mr. Davlin moved that the secretary be instructed to deposit one ballot for J. J. Hamblin, of Chicago, as the corresponding secretary.

The motion was agreed to, and Mr. Hamblin was declared unanimously elected.

Mr. Byrne, of New York, then nominated Enoch Remick, of Philadelphia, for financial secretary, saying: "In nominating that gentleman I beg leave to state that he is a trump every time, and don't you forget it."

Mr. Baggott, of Chicago, seconded the motion.

Mr. Trainor, of Baltimore, also desired to second the nomination of Mr. Remick.

Mr. Collins, of St. Louis, also seconded the nomination of Mr. Remick.

Mr. Remick was unanimously elected financial secretary, amid applause.

The President—Gentlemen, we have one very important office yet to fill—an office that requires a man of great nerve and muscle and firm determination—the office of sergeant-at-arms.

Mr. Sullivan, of New York, nominated a man whom he thought all would acknowledge to be competent to fill that office—Mr. Collins, of St. Louis.

Mr. Davlin, of Boston, humorously referred to his own expectations that he should have been selected for sergeant-at-arms, and said that were any other man than Mr. Collins nominated to fill it, he would contest the office for all it was worth; but as it was he would heartily endorse the nominee, and hoped that he would be triumphantly elected.

The secretary was instructed to cast the ballot of the association for Mr. Collins, and he was declared unanimously elected sergeant-at-arms.

In response to cries of "Speech! Speech!" Mr. Collins said: "Mr. President and gentlemen of this convention: While I have not been elected to the highest office in this association, which my modesty would prevent, still I am proud of the office that I have received, and still prouder that I have the association of such an excellent man as Mr. Young, of Chicago, who, I am sure, will always keep young. I regret that my Boston friend, Mr. Davlin, who will always be fresh in my memory, could not have a chance for this office. I assure you, should God spare my life until the next assemblage of this association, that I will try to keep down the unruly ones; and if moral suasion, sweet oil, and perseverance will not do, then I will resort to the only manly way. I take this opportunity, also, of thanking every one within the hearing of my voice for the kind feeling extended to me here."

The next business being the election of five members of the Executive Committee, Mr. Davlin moved that a committee of five be appointed to retire and nominate five gentlemen to be voted for as an executive committee.

Mr. Macdonald moved that the president-elect nominate five men for the committee.

Mr. Davlin accepted the amendment.

Mr. Birkett made a further amendment that the officers-elect retire and nominate the balance of the Executive Committee.

Mr. Macdonald accepted Mr. Birkett's amendment, with the addition that the officers-elect should also nominate the Auditing Committee. The motion in this form was then put and carried, and the officers-elect retired and presented the following nominations:

For Executive Committee, Jeremiah Sheehan, of St. Louis; John Saunders, Martin Boylan, Alexander W. Murray, and Thomas Hally.

For Auditing Committee, M. J. Duffy, of Louisville; Thomas P. Tuite, of Detroit, and J. G. Weldon, of Pittsburgh.

Mr. Macdonald moved that Mr. Remick cast the ballot for these gentlemen.

Mr. Foster moved as an amendment that the report of the committee be received and adopted, and that the secretary cast the ballot for the committee as nominated.

The motion as amended was agreed to, and the secretary cast the ballot for the gentlemen named above.

Mr. Foster, from the Committee on Credentials, announced that they had had no further credentials presented to them, and desired to be discharged.

The State delegations then named the following for State vice-presidents: New York, Joseph A. Macdonald, of New York City; New Jersey, James H. Kniffen, of Hoboken, N. J.; Pennsylvania, Albert N. Hicks, of Philadelphia; Connecticut, Robert Morgan, of New Haven; Rhode Island, Thomas Phillips, of Providence; Massachusetts, Isaac Riley, of Boston; Maryland, John A. Wilson, of Baltimore; District of Columbia, Edward J. Hannan, of Washington; Virginia, William E. Davis, of Norfolk; Missouri, J. L. Ryle, of Kansas City; Ohio, William Hally, of Columbus; Michigan, John B. Mouat, of Detroit; Minnesota, W. J. Frailey, of St. Paul; Illinois, T. C. Boyd, of Chicago; West Virginia, William Hare, of Wheeling; Kentucky, J. C. Strouse, of Louisville; Indiana, J. S. Farrall, of Indianapolis; Delaware,

Allen Speakman, of Wilmington; Iowa, John E. Allen, of Des Moines; California, J. J. Shepherd, of San Francisco.

The officers of the association accordingly are:

President, Andrew Young, of Chicago; First Vice-President, James Allison, of Cincinnati; Recording Secretary, J. J. Wade, of Chicago; Treasurer, William H. Graham, of St. Louis; Corresponding Secretary, J. J. Hamblin, of Chicago; Financial Secretary, Enoch Remick, of Philadelphia; Sergeant-at-Arms, David J. Collins, of St. Louis; Executive Committee, Jeremiah Sheehan, John Saunders, Martin Boylan, Alexander W. Murray, Thomas Hally, and the president, first vice-president, recording secretary, and treasurer; Auditing Committee, M. J. Duffy, T. P. Tuite, J. G. Weldon.

The President—The matter of vice-presidents for the States that have no representatives here will be left to the Executive Committee.

Mr. McCoach—There are a number of committees to be appointed; would it not be well to let the president have time to do this and do it by mail?

The President—Yes.

Mr. Davlin congratulated the members of the association upon the fact that they would have no difficulty next year in determining who was the chairman of the Executive Committee and who was not, making a humorous speech which was received with applause.

The president, Mr. George D. Scott, of New York, then yielded the chair to Mr. Young, the president-elect, saying: Gentlemen, it becomes my duty now to retire from the position I have had the honor to hold for the last year, and to present to you Mr. Andrew Young, of Chicago, your newly-elected president for the coming year. I congratulate you, Mr. Young, upon the unanimous vote you have received, and the evident unanimous feeling that has been exhibited in the selection of officers and committees.

The president, Mr. Young, on taking the chair, expressed his commendation of the work performed by his predecessor and the other officers. He then requested the new officers to take their places on the platform.

Mr. Weaver, of Philadelphia, moved that the thanks of the National Association be tendered to the retiring officers by a standing vote.

Mr. McCoach moved that a committee be appointed to prepare suitable resolutions and that the Executive Committee be authorized to have them suitably engrossed and framed, and presented to the retiring president at the next annual convention.

Mr. Weaver accepted the amendment, and thought a special set of resolutions should be prepared and presented to the retiring secretary, Mr. Murphy, of New York.

The motion as amended was agreed to.

Mr. Macdonald moved that when the convention adjourns it adjourn to meet in the city of Chicago, in June, 1885.

Mr. Macdonald then having moved that Chicago should be selected for the next place of meeting, it became evident that the convention had the Western fever, and on withdrawal of Chicago, at desire of its delegates, St. Louis was selected by 102 votes, Philadelphia receiving two votes, and 25 members persisting in voting for Chicago.

Mr. Phillips, of Providence, offered a resolution tendering the thanks of the National Association to the local association of Baltimore for their kindness and attention to the members of the convention during the session.

Mr. Gallagher, of St. Louis, promised on behalf of the city of St. Louis, to receive the delegates in a fitting manner. "We will receive you with open arms; we will give you all the run of our city; we will show you the greatest river the world can produce; we will show you that there is a river of feeling in the hearts of every plumber in the city of St. Louis that runs as free and is as great as the great Mississippi that flows to the sea. Our hearts and our pockets are at the service of this National Association."

Mr. Boyd, of Chicago—I want to adopt the language of that big-brained man from St. Louis, and in the same words tender thanks to the Baltimore Association for their kind reception of this convention.

The resolution of thanks was then unanimously adopted.

Unfinished business being then in order, Mr. Byrne, of New York, asked that a set of engrossed resolutions be tendered to Mr. M. J. Lyons, of Brooklyn, for his valuable services as treasurer.

Mr. McCoach thought this had been already included in his resolution.

The President—The resolution that was passed included all the officers.

Mr. Trainor, of Baltimore—If we have succeeded in pleasing the gentlemen who are termed our guests, we do not consider that it is altogether due to our humble efforts, but to the hearty and sociable spirit of our guests, and also to the hospitable air of our native city.

The following resolutions were then offered by the Washington delegation:

Be it resolved, That it is the sense of the Association of the Master Plumbers of the United States of America, in convention assembled, that a practical and skilled master plumber should be admitted as a member of municipal, State, and national boards of health now organized or to be organized.

Be it further resolved, That both collectively and individually we, the master plumbers of the United States, will

use our best endeavors and all honorable and legitimate means in our power to forward this measure by municipal, State, and national legislation to a final issue.

Mr. Finerty, of Boston, thought the word "master" before plumber should be stricken out and "practical" be substituted. "This resolution is to compel the authorities to appoint nobody except a master plumber, as it now stands. I think that is eminently wrong."

Mr. Davlin thought "it would be well to make the change, for the reason there are men who are virtually master plumbers that have no practical knowledge of the art. There are men that from the fact that they have been carrying on the plumbing business in connection with the tinware business must be admitted to the society of master plumbers in order to accomplish the object for which we are united. Under the provisions of this resolution one of those men would be competent for the boards of health. If we eliminate the word 'master' and substitute the word 'practical' we will accomplish the desired object."

The change was satisfactory to Washington, and the resolutions as amended were unanimously adopted.

Mr. Hussey, of Boston, moved that the sympathy of this association be extended to the master plumbers of New York in their troubles with the journeymen, and that the aid of the National Association be offered them.

Mr. Weaver thought their troubles were over, and it would be well to wait a while.

Mr. Davlin—This is the first proper opportunity that has been offered to show to our New York brethren that when their interests are touched we feel that our interests are touched, and we express to them our hearty sympathy. What assurance has the gentleman from Philadelphia that his turn may not come next? What assurance have we in Boston, peaceably minded as the plumbers and citizens generally are, that it may not be our turn next? None whatever. When trouble of whatever nature may come upon us we naturally expect that every city represented in this convention will offer us its sympathy as quickly as possible and as often as necessary. I ask the present Executive Committee to take this matter under their earnest consideration, and confer with the different local associations and gather all the information possible, and next year we may enact some legislation that will protect us not only from the material dealers, but from any and every source from which injury may come.

Mr. Weaver—I am in favor of the resolution.

Mr. Macdonald, of New York—I should be very happy to announce that the trouble is over, but it is not over, and we do not know when it will be over.

Mr. Mitchell, of New York—We have done everything that honorable men could do to avert the unhappy struggle and create, if it was possible, a unity of interest for the welfare of both masters and journeymen. We failed. So we resolved that until Mr. Toumey (I will mention his name) was made right in his honorable demands the master plumbers of New York would declare that the union men in their employ were no longer desired. We have no desire to injure the organization of journeymen plumbers. We have the American spirit of organization for protection. We believe that they have rights which are theirs to preserve and perpetuate, but we do not forget that we have rights which it is their duty not to trespass upon. But if we can get along equitably and honorably it will produce the best results for all.

Mr. Hussey's motion was then unanimously adopted.

New business being in order, Mr. Byrne, of New York, suggested that the Executive Committee appeal to the local organizations, and present to the various members of Congress the importance of having a committee of plumbers organized to visit the principal cities of Europe and examine into the plumbing systems in use there. Two plumbers should be selected from each of the large cities in the United States—Philadelphia, Chicago, Baltimore, Boston, New York, Brooklyn, and others; there should be a proper appropriation made, and these plumbers should be empowered to make this tour of inspection. "I claim that we have as good a right to ask Congress to appropriate money enough for this purpose as any other interest in the United States."

Mr. Boyd thought Article 8 of the constitution should be acted upon concerning appropriation of all moneys for the ensuing year.

Mr. Byrne—It would be well for the association now to give to the Executive Committee full power to manage the association and all the required money. I therefore move that the Executive Committee have full power to draw on the association for whatever funds they want from time to time.

The motion was agreed to.

Mr. Davlin moved that the Executive Committee be instructed to have a sufficient number of copies of the proceedings of the convention printed, so that a copy may be placed in the hands of every member of the organization.

The motion was unanimously agreed to.

Mr. J. F. Cummings (representative of THE SANITARY ENGINEER) tendered the thanks of the press to the officers and members of the convention for the kindness and courtesy extended during the sessions.

Mr. Scott moved that a vote of thanks be extended "for the impartial and correct reports of the proceedings as we have seen them in the daily press of Baltimore."

The motion was agreed to.

It was moved and carried that the remaining committees be appointed by the chair, and that the names be sent to the associations by mail.

The convention then adjourned.

On Thursday evening the delegates sat down at a banquet at the Eutaw House, as guests of the Baltimore association. After a generous menu had been discussed, Mr. W. H. Rothrock, of the Baltimore association, welcomed the guests in a stirring speech, and toasts were called for. Col. George D. Scott, of New York, responded to the first, "The National Association of Master Plumbers," briefly. He diverted the duty to T. J. Byrne, who made a characteristic speech; for the Master Plumbers' Association of Baltimore, John Trainor replied; J. J. Wade, of Chicago, spoke for the "Sanitary Portion of the Trade;" Dr. James F. McShane, Assistant Health Commissioner of Baltimore, represented the "Medical Faculty." "The Water System of Baltimore," had a spokesman in General Ferdinand C. La Trobe; George R. Phillips, of Providence, responded for "The Guests;" and "The Ladies" were put in charge of James Davlin, of Boston; Henry McShane, of Baltimore, spoke of the "Manufacturing and Commercial Interests of the Country," and the Mayor of Baltimore was present, and passed in rapid review the striking features of several of the large cities represented in the convention, and gave a warm welcome to the city.

The delegates left Baltimore with warm recollections of its hospitality.

TAUNTON WATER-WORKS.

TAUNTON, MASS., June 16, 1884.

To the Editor of THE SANITARY ENGINEER:

In connection with your article on page 593, Vol. IX., on "Water Reports for 1883," permit me to supply some figures which were omitted from the Taunton report. Our estimates of the quantity of water used are derived from the nominal capacity of the pumps, with an allowance of about eight per cent. for lost action or slip. This allowance in turn was determined by weir measurements. The proportion of the water metered is as follows for 1883:

Consumption through domestic meters.....	25,103,517
Consumption through manufacturing meters.....	53,214,041
Total consumption through meters.....	78,317,558
Total gallons pumped for year.....	223,307,025
Less metered water.....	78,317,558
	144,989,467
Receipts from domestic meters.....	\$6,530 10
Receipts from manufacturing meters.....	7,492 02
	\$14,022 21
Total receipts from water-rates.....	\$20,002 00
Less receipts from metered water.....	14,022 00
	\$15,970 00
Receipts from unmetered water.....	\$15,970 00
Metered water brings.....	17.9 cents per 1,000 gallons.
Faucet water brings.....	11

I have compiled from reports, special circulars, and from Mr. Croes' statistical tables, some figures relating to water-works, from which I have drawn certain conclusions and established certain averages, feeling quite sure, however, that a larger compilation would probably produce somewhat different results:

	Average Cost of Works per Mile of Mains.	COST OF 1,000 GALLONS DELIVERED.		Total Cost of 1,000 Gallons delivered.
		For Interest.	For Operating.	
Gravity system, nine examples.....	\$14,825	Cents. 4.88	Cents. 1.66	Cents. 6.54
Stand-pipe, four examples.....	21,250	4.5	1.7	6.2
Direct-pump, thirteen examples.....	16,408	5.1	2.6	7.7
Reservoir, twenty-seven examples.....	20,443	9.6	3.55	13.1

In gravity systems, interest is 75 per cent. of total maintenance.	
In stand-pipe " " 72 " " " "	
In direct-pumping " " 66 " " " "	
In reservoir " " 73 " " " "	

I am not an enthusiast for any system of direct pumping, but surely these figures do not indicate that a reservoir system is always cheaper to maintain than any other system (excepting, of course, a gravity supply).

Yours respectfully, WILLIAM R. BILLINGS,
Clerk and Superintendent.

[Mr. Billings sends a tabular statement of statistics of fifty-three towns, too long for us to publish.

The facts given by Mr. Billings in relation to the consumption of water in Taunton are suggestive. There are 464 meters in use, and the average daily amount of water they pass is 462 gallons. The average consumption of each of the 1,825 unmetered services is only 218 gallons. This includes the water used for all public purposes, such as fires, street-washing, etc., and the leakage in forty-seven miles of pipe. This is a record of which the managers of the Taunton Water-Works may be proud of. It shows good workmanship and careful supervision.

In the matter of the expense of operation and maintenance of the works and interest on their cost, Taunton makes a good showing also, when a correct basis of comparison is taken. On the basis used by Mr. Billings, the cost per 1,000 gallons delivered, there are only fifteen towns out of fifty-three cited by him in which it costs more to deliver water than it does in Taunton; but if the annual cost of furnishing water to each consumer or tap is taken as the basis, in thirty towns out of the fifty-three it is found that the cost is greater than at Taunton.

It seems to us very clear that the only rational comparison of cost of water-supply is one based on the number of taps or service-pipes, and not on the population of the towns, nor to any great extent on the reputed quantity of water used. The economical management of water-works does not consist in furnishing an unlimited amount of water at a low rate, to be wasted indiscriminately, but in supplying each consumer with as much water as he really needs at the least cost. To illustrate this, Columbus, O., and Taunton, Mass., are both supplied by direct pumping. According to Mr. Billings' mode of computation, it costs in Columbus six cents to supply each 1,000 gallons, and in Taunton, 11½ cents. But if we consider the number of consumers, we find that there are in Columbus, 2,288, and in Taunton, 2,289, and that it costs the city for interest and maintenance \$26.04 a year to furnish each consumer with water in Columbus, and \$15.64 a year to supply each Taunton consumer. So, also, with the following couples of towns, which may be compared:

	No. of Taps.	Annual Cost per Tap.	Cost of 1,000 Gals.
Poughkeepsie, N. Y.....	1,436	\$37 45	10 cents.
Woburn, Mass.....	1,413	25 63	13 "
Dayton, O.....	1,040	60 80	14.6 "
Brookline, Mass.....	1,113	44 84	25 "
Fitchburg, Mass.....	1,255	23 68	5.5 "
Northampton, Mass.....	1,259	10 08	7 "
Lowell, Mass.....	6,283	22 11	14 "
Lynn, Mass.....	5,439	12 50	12 "

There are, of course, many cases in which the proportion is nearly the same by either way of reckoning, but these examples are cited to show that the cost of delivering given volumes of water is not a criterion of the actual expense of different systems of supply.

To compare the expensiveness of the several modes of furnishing water, as classified by Mr. Billings, it seems better to get at the cost of the water as delivered to the consumer, by comparing the figures for nearly the same number of towns of the same size constructed and operated on each system.

Taking the eight towns supplied by gravity, of which full statistics are given in the table prepared by Mr. Billings, the thirteen towns supplied by direct pumping, and the fifteen towns supplied by pumping to reservoirs, which have nearly the same aggregate population as the direct-pumping towns, the results are as follows:

	Gravity.	Pump Direct.	Pump to Reservoir.
Number of towns compared....	8	13	15
Total population.....	130,813	349,869	350,996
Total cost of water-works.....	\$3,492,217	\$6,517,704	\$10,448,738
Miles of pipe.....	238.6	409.9	599.6
Number of service-taps.....	15,856	26,173	51,325
Annual expenses for interest..	\$166,763	\$377,744	\$546,025
Annual operating expenses....	51,405	221,849	186,083
Total annual expenses.....	\$218,168	\$599,593	\$732,108
Average daily supply, gallons..	13,030,000	24,000,000	22,000,000
Average daily consumption per tap, gallons.....	822	916	428
Annual cost per tap.....	\$13 76	\$22 91	\$15 12
Annual cost per mile of pipe..	914 37	1,462 62	1,221 00
Annual cost per head of population.....	1 67	1 71	2 08

It would appear from this that the cost to the consumer is about fifty per cent. greater for direct pumping than for a reservoir system. If water-works are owned by a private corporation, the annual expense for construction and operation will be apparently diminished about twenty per cent by having direct-pumping works, rather than a reservoir. The conclusion which may be drawn from these data is, therefore, that where the public owns the works, it will be better to spend a little more money and have a reservoir; but if it is a private enterprise, direct pumping will be the more economical.

It is possible that, as Mr. Billings suggests, a more extended comparison of data might lead to some modification of these results, but there is no reason to suppose that there would be any material change.]

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JUNE 21, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	11	16.3	1	9.0	2		4															
Boston	Mass.	435,000	157	18.8	47	29.9	3	1	35	1	7	3	1	2		5	10	1	5			3	3	
Lowell	Mass.	71,500	24	17.5	18	75.0	1	1	1		2	1		1		1	2		2					
Worcester	Mass.	69,000	19	14.3	5	26.3	1		3			1				1	1		2					
Fall River	Mass.	67,000	20	15.5	8	40.0	1				3					1	1		1					
New Haven	Conn.	69,500	23	17.2	3	13.0			5		1			1		2	1		1					
Providence	R. I.	125,000	28	11.6	7	25.0	1	1	5		1					3	1		1					
Total		872,000	282	16.8	89	31.5	9	3	53	1	14	5	1	4		8	18	1	13		1	3		3
EASTERN CITIES.																								
Albany	New York	103,000	26	13.1	6	23.0			8			1					2						1	
New York	New York	1,355,000	634	24.3	280	44.1	25	4	112	7	72	15	3	5	5	12	44		17		30	7	9	
Brooklyn	New York	670,000	256	19.9	108	42.1	6		35	3	31	7	1	1	4	9	17		6		4	7	3	
Hudson County	New Jersey																							
Newark	New Jersey	154,000	57	19.2	23	40.3	3		10	1	7			1	1	1	2	2	2		1			
Philadelphia	Pa.	940,000	374	20.7	145	38.7	12	1	55	3	32	6	2	9	1	17	20	6	13		4	2	3	
Wilmington	Delaware	50,000	16	16.6	6	37.5			1		1			1		1								
Total		3,272,000	1,363	21.7	568	41.6	46	5	221	14	143	29	6	17	11	40	85	8	38		38	17	1	16
LAKE CITIES.																								
Buffalo	New York																							
Rochester	New York	105,000	28	13.8	10	35.7	6	1	5	1		2	1	1		1		3	1	1	2			
Cleveland	Ohio	210,000	49	12.1	19	38.7	3	1	6	1	1			1	1		3	1	1					
Detroit	Michigan	140,000	52	19.3	19	36.5			3		3	6				5		1		2	2			
Chicago	Illinois	650,000	237	18.9	130	54.8	6	2	24	4	17	5	1	5		11	1	8		22	2		2	
Milwaukee	Wisconsin	147,000	46	16.3	28	60.8			4		2	2				1	1			2	2			
Total		1,252,000	412	17.1	206	50.0	15	4	42	6	23	15	2	7	1	7	21	2	12	1	27	8		2
RIVER CITIES.																								
Pittsburg	Pa.	210,000	66	16.3	35	53.0	5	1	6		12	4				2	4		2		3	1	2	
Cincinnati	Ohio	275,000	84	15.8	31	36.9	3	1	10		10	2			1	1	5	1			1	1	2	
Louisville	Ky.	137,000	43	16.3	11	25.5	3	2	9							1		1						
Indianapolis	Ind.																							
Minneapolis	Minn.	100,000	23	11.9	7	30.4	2	1	4			2				3	2			2				
Evansville	Ind.	34,000	11	16.8	8	72.7	1		1		3					2		1		1				
St. Louis	Mo.																							
Total		756,600	227	15.6	92	40.5	14	5	30		25	8		1	3	4	15	3	3		6	2	3	2
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	70	27.2	40	57.1	1		11		19			2		3	2	2					2	
Richmond	Va.	41,000	19	24.1	12	62.1					11			2		1	1	1					1	
Charleston	Col.	32,400	36	57.8	26	72.2			2		5			3	1									
Charleston	Wh.	25,000	12	25.0	4	33.3																		
Atlanta	Col.	27,800	32	59.9	10	31.2			6		4			3	2		1				1			
Atlanta	Wh.	30,000	13	22.5	7	53.8			13		4									1				
Augusta	Col.	20,000	17	44.2	8	47.0			4		3			2	1		1							
Augusta	Wh.	20,000	7	18.2	4	57.1		1	1	1	1													
Nashville	Col.	15,000	13	45.1	5	38.4			5		4					1								
Nashville	Wh.	35,100	12	17.8	3	25.0			3		3			1	1									
Memphis	Col.	21,300	13	31.8	6	46.1			3		2					1								
Memphis	Wh.																							
New Orleans	Tenn.																							
New Orleans	Col.																							
New Orleans	Wh.	171,000	61	27.7	47	51.6	3		8		16	1		2	3		1				1	1	2	
New Orleans	Col.	63,000	54	44.6	22	40.7	1	1	5		4			1	3		3		1		1	1	1	
Total White		455,600	224	25.5	117	52.2	4	1	23	1	44	1		7	4	3	3	2	1		3	2	1	
Total Colored		248,800	216	45.2	107	49.5	2	1	30		33			11	7	1	3	1	1		1	1	4	
Total in 30 U. S. Cities		6,857,300	2,724	20.6	1,179	43.2	90	21	399	22	282	58	9	47	26	63	150	17	67	1	76	33	8	29
Total in 28 English Cities																								
June 7	Total in 28 English Cities	8,762,354	3,286	19.6			110				42	24		39		62								
" 7	8 Scottish Cities	1,254,607	561	23.3			14				12	15		6		6								
" 7	16 Irish Cities	858,660	353	21.4			7		50		7	2		4		7			101		24		48	131
May 17	135 German Cities	8,799,499	4,586	27.1	2,287	40.8	129		643	41	299	148		40		52			76				36	
June 7	15 Swiss Cities	455,537	198	22.6			6		20		14	6		10		4			535		63	20	4	55
June 7	15 Swiss Cities																	19						

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

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The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending June 21, 1884, in 30 cities of the United States, having an aggregate population of 6,857,300, there were 2,724 deaths, which is equivalent to an annual death-rate of 20.6 per 1,000. In the North Atlantic cities the rate was 16.8; in the Eastern cities 21.7; in the Lake cities 17.1; in the River cities 15.6; and in the Southern cities, for the whites 25.5, and for the colored 45.2 per 1,000. Of all deaths, 43.2 per cent. were children under 5 years of age, the proportion of deaths of this class being highest in the Southern cities among the whites—viz., 52.2 per cent.

Accidents caused 3.3 per cent., consumption 14.6, croup 0.8, diarrhoeal diseases 10.3, diphtheria 2.1, typhoid fever 1.7, malarial fevers 0.9, scarlet fever 2.3, pneumonia 5.5, acute bronchitis 2.4, measles 2.7, puerperal diseases 1.2, small-pox 0.2, and whooping-cough 1.0 per cent. of all deaths. Diarrhoeal diseases caused 10.9 per cent. of all deaths in the River cities, 15.2 per cent. among the colored, and 19.6 per cent. among the whites in the Southern cities; diphtheria caused 2.6 per cent. in the Lake cities, and measles 6.5 per cent. of all deaths in the Lake cities. Deaths from small-pox were reported in Philadelphia, Pittsburg, Cincinnati, and New Orleans.

PROVIDENCE, R. I.—The Superintendent of Health reports 10 cases of measles, 5 cases of scarlet fever, and 7 of typhoid fever.

BOSTON, MASS.—C. E. Davis, Jr., reports 17 new cases of diphtheria, 46 of scarlet fever, and 12 of typhoid fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 6 cases of diphtheria and 29 of scarlet fever under treatment June 21.

DETROIT, MICH.—Dr. O. W. Wight reports 15 new cases of diphtheria and 8 of scarlet fever.

BALTIMORE, MD.—The weekly report of the Health Officer records 180 deaths, including 111 under 5 years of age. The annual death-rate for the whole population was 22.88 per 1,000, or 20.11 for the whites and 39.00 for the colored. Diphtheria caused 1 death, scarlet fever 6, croup 2, whooping-cough 1, typhoid fever 1, malarial fever 1, consumption 16, acute lung diseases 7, diarrhoeal diseases 51, and violence 5.

MASSACHUSETTS.—During the week ending June 14, 1884, in 99 cities, with an aggregate population of 1,343,037, there were 372 deaths, which is equal to an annual death-rate of 14.4 per 1,000. The highest rates recorded were 23.05 in Salem, and 22.33 in Newburyport. The principal infectious diseases caused 38 deaths, including diphtheria and croup 11, scarlet fever 8, diarrhoeal diseases 7, whooping-cough 4, and typhoid fever 3. To diseases of the respiratory organs were attributed 37 deaths, and to consumption 61.

HUDSON COUNTY, N. J.—Mr. C. A. Rooney, in his report for the month of May, gives the number of deaths 422, and the annual death-rate 24.2 per 1,000. The death-rate is 1.6 above that of the average for the same

month for the past seven years. The number of deaths under 5 years of age was 159, or 37.6 per cent. The increase of the death-rate was due principally to the increase of deaths over 5 years of age. The diseases contributing principally to the increased rate, were consumption 63 deaths, and acute lung diseases 70. Accidents caused 23 deaths, diarrhoeal diseases 9, diphtheria 7, typhoid fever 10, scarlet fever 11, and measles 7.

DISTRICT OF COLUMBIA.—During the month of May there were 349 deaths; whites 177, colored 172. The death-rate for the whole population was 20.94 per 1,000, or 16.25 for the whites and 29.78 for the colored. The death-rate is lower by 0.53 than the average of the corresponding month for the past ten years. Of the decedents 115, or 32.9 per cent., were under 5 years of age. The principal causes of death were consumption 77, acute lung diseases 30, and scarlet fever 34. Measles caused 4 deaths, typhoid fever 3, malarial fever 5, diphtheria 2, whooping-cough 4, diarrhoeal diseases 8, and violence 22.

SAN FRANCISCO, CAL.—Dr. J. L. Meares, Health Officer, reports for the month of May 457 deaths, of which 127 were under 5 years of age. Diphtheria caused 5 deaths, croup 5, measles 3, typhoid fever 9, malarial fever 4, whooping-cough 3, consumption 75, acute lung diseases 51, and violence 29.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales during the week ending June 7 was 19.6 per 1,000. The highest annual death-rate from measles was 4.0 in Wolverhampton and 3.0 in Oldham, and from scarlet fever 2.1 in Oldham. Small-pox caused 40 deaths in London, exclusive of 20 registered in the hospital ship "Atlas"; also 3 in Liverpool, 2 in Hull, and 1 in Birmingham, Sunderland, and Cardiff.

LONDON.—Births, 2,098; deaths, 1,458, which is equivalent to an annual death-rate of 18.9 per 1,000. The number of cases of small-pox continues to increase, the number under treatment in the hospitals being 1,166, there having been 175 new cases admitted during the week. The number of fatal cases of small-pox was 40, against 36 for the previous week, and exceeded the corrected weekly average by 18. The number of fatal cases of whooping-cough, which had gradually diminished from 119 to 74 in the preceding four weeks, rose to 88. Measles caused 85 deaths, scarlet fever 21, diphtheria 16, typhoid fever 19, and 17 from diarrhoeal diseases. To diseases of the respiratory organs were attributed 249 deaths, and to consumption 171. Different forms of violence caused 58 deaths.

SCOTLAND.—The death-rate in the 8 principal towns for the week ending June 7, 1884, was 23.3 per 1,000.

EDINBURGH.—Deaths, 109; annual death-rate, 23.0 per 1,000. Measles and scarlet fever each caused 2 deaths, diphtheria 3, whooping-cough 10, diarrhoea 1, acute lung diseases 15, and violence 3.

GLASGOW.—Deaths, 249; annual death-rate, 25.0 per 1,000. Measles and scarlet fever each caused 4 deaths, diphtheria 7, whooping-cough 22, diarrhoea 4, acute lung diseases 56, and violence 8.

FRANCE.—Havre.—Week ending June 7: Deaths, 46; annual death-rate, 22.6 per 1,000. Scarlet fever caused 1 death, typhoid fever 1, bronchitis and pneumonia 8, consumption 8, diarrhoeal diseases 5, and violence 1.

BRUSSELS.—Belgium.—Week ending May 31: Deaths, 185; annual death-rate, 23.1

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COMPULSION IN SANITATION.

PUBLIC health organizations have been defined as institutions which make people do for their own and the public good what they do not like or understand and what they do not always believe in. To what extent and under what circumstances this compulsion should be exercised is one of the most difficult questions in sociology; it is practically impossible to give to it any general answer which shall be applicable under all circumstances, and in attempting to decide any particular case, it will almost always be found that there are great differences of opinion among educated and competent men as to the extent to which it is right or expedient to compel individuals to yield their own wishes or interests to prevent disease among the community in which they live. Quarantine, the compulsory notification of disease, the inspection of plumbing, the taxation of property-owners for the construction of water-works or sewers which they do not want—and in any community there will be some who do not want these things—compulsory vaccination, the prevention of adulteration, and in fact everything pertaining to the securing of public health by legislation involves this question of compulsion.

We have used above the words "right" and "expedient" as if they meant different things. Without stopping to discuss the question as to whether this be so or not, we must practically consider the question of expediency in each individual case if we are to obtain permanently good results from legislative measures.

Sanitary laws belong for the most part to that class of rules whose formula is "thou shalt not;" they require a man to forbear from injuring his neighbor's health; nevertheless, they may require the doing of a certain act to insure such forbearance, as, for instance, the filling up of the ancient family cesspool and the putting in of a drain-pipe to connect with a sewer. The necessity for such laws depends to a great extent on the aggregation of human beings; for example, in the country a man may usually dispose of his house-drainage as he likes, while in the city it is a very different matter.

The decision as to whether this necessity exists or not in any given case, and also as to what particular mode of action is best calculated to meet such necessity, must depend upon the will of the majority of the community, and also upon the opinions of the educated minority of the community. When these two coincide the way is plain; but, except in special emergencies—as, for instance, just after an epidemic—these two things rarely do coincide. Hence it is that we find almost everywhere that there are sanitary laws which are not enforced, and that it is not possible to judge of the extent to which men are restrained from injuring their neighbors' health by merely examining the statute book or reading the health board regulations. Also, it is often the case that when insanitary conditions in some part of a city are brought to public attention, when the foul condition of some particular slum, or sewer, or tenement-house becomes a matter of comment in the daily press, there will arise a demand for laws and ordinances to correct and prevent these evils, when, as a matter of fact, laws amply sufficient for the purpose exist, but are not enforced.

And they are not enforced for various reasons. It is a troublesome and sometimes a dangerous

thing to enforce such laws, and unless it is made the special business of some official to do this it will not be done. It is by no means certain that it will be done even if there is such an official. He will not find it difficult in most cases to present some excuse of expediency for his failure. He will say that he does not execute the tenement-house inspection laws, because if he did he would have to turn poor people into the street; that he does not attack certain nuisances, because by so doing he would offend powerful corporations and it might cost him his office; that he does not press the anti-adulteration acts, because he fears that so doing would raise a crowd of enemies to the whole subject of public hygiene. And in each case it may be very difficult to say whether he has been wise and prudent and has really acted for the best interests of public health, or whether he has been unduly influenced by the desire of a quiet life and of retaining his office.

An active and energetic health officer must cause some hardship to individuals and must make some enemies; his doing so is in some measure a test of his efficiency.

And when this happens it is the duty of the educated portion of the community, and especially of those who aim to lead or to express public opinion—of the pulpit, the press, and the medical profession in particular—to be active in their support of their sanitary representative, to be slow in joining the clamor against him as a selfish tyrant, and to let him feel that he has a good solid support of public opinion at his back. We have never been unduly enthusiastic as to the merits of that class of sanitary officials whose chief work is writing essays on the value of health and the importance of cleanliness, and who seldom or never attempt to exercise what powers they have to suppress nuisances and expose the dangers to public health which they know to exist in particular cases; but, on the other hand, we have no sympathy with those who object to all real efficacious control of a particular premises or city to prevent its becoming dangerous to its neighbors, and who rant about liberty and States rights and non-interference whenever it is proposed to stop talking and actually do something to prevent the spread of contagious and infectious disease, to stop the pollution of municipal water-supplies, or to check adulteration frauds and the like.

In public hygiene in this country at the present time there is certainly no danger of the exercise of too much compulsion; in most cases communities are suffering loss in health and in pocket, because there is not enough of it brought to bear upon those who through ignorance or selfishness are injuring their neighbors.

WATER WASTE AND SHORTAGE.

THE annual appeal of the Commissioner of Public Works to the citizens of New York, to be careful in their use of water as the supply is likely to run short, has been made again this summer, and probably it has had the usual effect, and that is—no effect at all. The habit of wasting water is so firmly established that mere appeals to people through the press make little or no impression. The reader says it is a shame that people should be so careless, and then goes to a faucet and lets ten gallons run to waste to get a quart for his own use. The great consumption of water

is due as much to this lavish use as to leaks. To correct this abuse is difficult. Inspection will not remedy it, for the waste does not occur while the inspector is in the house. The direct appeal to the pocket, made by compelling a householder to pay for what water he uses by measure, is the only way to create a habit of careful use of water.

There is besides, however, a very large amount of water wasted through defective fittings. Out of 9,893 house-drains in sewers examined at night in 1883, 17 per cent. were found to have water wasting from them at an average rate of about 5,000 gallons a day, and out of 15,308 buildings inspected, 11½ per cent. contained leaky water-fittings.

The 1,631 buildings which wasted water all night and day were about two per cent. of the total number of water-takers, but they were letting nine per cent. of the total daily supply run to waste. There is no excuse for this sort of thing, and it ought to be visited with severe penalties. If the same proportion of wasteful occupants of houses prevails among the unexamined buildings, the only wonder is that there is any water left for legitimate use. The rains may fill up the storage reservoirs, but the aqueduct cannot bring down any more water than it is now supplying, and the natural increase of consumers must be provided for by reducing the needless waste indulged in by the present consumers.

On another page our readers will find full extracts of several essays which were read by practical master plumbers during the convention at Baltimore. It will be seen from them that plumbers do not hesitate to grapple with the broadest questions which arise in the relation of the plumbing trade to modern sanitation and sanitary government. The challenge which Mr. Allison, of Cincinnati, throws down to the architects to disprove their shortcomings in the matter of house sanitation, will, without doubt, be taken up, and the discussion ought to be full of interest and profit to both architects and plumbers. The Boston essay is one of the best statements of the position of the plumber in sanitary progress which has been made. Taking four of the essays—from Cincinnati, Chicago, Boston, and St. Louis—they give from the plumber's point of view the relation of the craft to general sanitation, to the architect, the householder, and to that public which demands constant progress in order that it may keep pace with the constant spread of sanitary knowledge. The remaining essays, from Brooklyn, Baltimore, and Philadelphia, discuss the advantages of association and the relation of the master plumbers to the dealer in plumbing materials. Altogether they are the first tolerably complete statement from the inside of the condition and aims of modern plumbing which has been published.

THE extent to which the healthfulness of a house is becoming a factor in covenants between landlords and tenants is again illustrated in the case of *Bird versus Greville* just reported from England. The plaintiff and landlord sued for fourteen weeks' rent of a furnished house, that being the period for which it had been rented, and the lease signed, though the defendant had never taken possession because of a supposed danger of infection. A child in the landlord's family was ill with the measles, but the fact was concealed from the tenant, who, on learning of it afterward, declined to take the house and refused to pay the rent. It was claimed in behalf of the landlord that the child had been removed a week before the beginning of the tenant's term of lease, and the house had been disinfected, but nevertheless the justice decided that the landlord could not recover the rent. It was not necessary, he said, "to determine whether there had been fraudulent misrepresentation about the child's illness. In every contract for letting a furnished house, the law implied a covenant that the house should be in a fit state for occupation at the commencement of the tenancy. Here the child had been ill with measles in the house a

week before the day on which the tenant was to enter, and, though the medical evidence was conflicting, he declined to hold that all danger of infection was over. He therefore came to the conclusion that the landlord was not entitled to recover the rent, and gave judgment for the defendant with costs."

THE strike by the journeymen and lockout by the master plumbers of this city has been settled, and the men returned to work last Monday. The settlement was reached through an agreement between a committee acting for the Master Plumbers' Association and one for the Journeymen Plumbers' Benevolent Protective Union, in which the masters conceded the right to the journeymen of leaving work on Saturday in time to reach the shop by 4 P. M. The journeymen admitted the right of the masters to employ and discharge whomsoever they please, and conceded that Mr. Toumey, in whose shop the strike began, should not be required to take back his discharged journeyman, who has found work with another master plumber. The journeymen had generally returned to work on Monday, and the strike is closed.

The full text of the agreement between masters and journeymen is as follows :

NEW YORK, July 2.

To Whom it May Concern :

First—That we concede, and have always conceded, the right to employers to hire and discharge whomsoever they please. Should any dispute arise as to the justice of discharging or leaving it should be subject to appeal to the Board of Arbitration of the two associations.

Second—That the Master Plumbers' Association concedes the right of men to be paid on the job by 4 P. M., and to stop work in time to be paid off at the shop at 4 P. M. Saturday.

Third—That when men are working out of town reasonable time be allowed going to and coming from work.

Fourth—The right, after due notice is given of the employment of non-union men, to withdraw our men without any interference on the part of the Master Plumbers' Association.

Fifth—That all men or boys who were members of the Journeymen's Association at the time of the strike be reinstated.

Sixth—That a general amnesty be declared by both associations.

Seventh—That the strike and lockout be declared off simultaneously.

For the Master Plumbers' Association—N. G. Geraty, Phillip Brady, James Pearson, James Muir, Thomas J. Byrne, James Gilroy, Chairman Arbitration Committee.

For the Journeymen Plumbers' Association—George W. Flood, James Gallagher, Edward J. McCabe, James Sullivan, Patrick Coyle, Chairman Journeymen's Association.

A SHAME TO JERSEY CITY.

AN inspection of the sanitary condition of the Jersey City public schools was made by a committee recently, and revealed an almost incredible and revolting state of affairs in the condition of the yards and outhouses. The poisoned air from these sources and the sewer-gas from defective drainage find access to the class-rooms of a majority of the schools, while in all that are heated by hot-air furnaces the fumes of coal-gas permeate the building.

The committee says that a summary of the net result of the inspection may be given as leaky roofs, yards and cellars flooded during storms, the most imperfect heating and ventilating, and overcrowding of the pupils. There is no means of admitting fresh air except by doors, transoms, and windows in the best school buildings, consequently no special way of carrying off foul air. The outhouses of School No. 16 are in such a condition that the health, not only of the school, but of the neighborhood, is threatened. In front of School No. 10 is a drain on the street, while in the rear is another which carries away all the filth in the locality.

A CREMATION society is about to be formed in New York City. It is announced that ground has been purchased for works near Crawford, N. J.

OUR BRITISH CORRESPONDENCE.

A Nuisance Exhibitors are Exposed to—Annual Meeting of the Social Science Association—Poisoned River Water—Plague of Caterpillars—Opening the Health Exhibition on Sundays—Plague at Bagdad.

LONDON, June 21, 1884.

EXHIBITORS at the Health Exhibition are being annoyed by intimations from persons claiming to represent newspapers, exhibition guides, etc., that their exhibits will be fully described for a consideration. One firm thus approached writes as follows to the *Times*, which paper characterizes the proposition as "Levying Blackmail on Exhibitors :"

"If you can put exhibitors on their guard against a most impudent attempt to levy blackmail you will be doing a public service. You can easily imagine what the result will be if this gentleman does not get his £2 5s. 'according to space.' Exhibitors at shows have many expenses, and, as a rule, little profit, and yet competition appears to compel us to keep pace with the times, and put in an appearance. But if some hundreds of papers, English and foreign, follow this lead we shall require long purses." The following is the circular inclosed: "Deutsche Bade-Zeitung *Union*, Organ für Öffentliche Gesundheitspflege (Organ for purposes of Hygiene and Public Health), Gegründet, 1856 (founded 1856). 'Frankfort-on-the-Main, June 1, 1884. We beg to inform you that we have delegated Mr. F. Nentwig, our special reporter, to visit the International Health Exhibition, and shall be favored by your assisting him in his official duties. Yours most respectfully, the Editors of the *Union*.' Dear Sir: As special reporter of Deutsche Bade-Zeitung *Union*, as well as correspondent of a considerable number of German and Austrian newspapers, I shall shortly visit the International Health Exhibition now being held in London. I shall be much obliged by your informing me, if you wish for a full report of your exhibit, for which my charge is £2 5s. according to space. An early answer will oblige, yours obediently, F. NENTWIG, Frankfort-on-the-Main, June 1, 1884."

I have seen the circular here quoted, also a letter to an exhibitor, in which the writer, who signs himself A.M., M.D., states he has been employed by an eminent firm of publishers to prepare a history of the exhibition. He informs my friend that if he wants his exhibit noticed he will be glad to have particulars, and his charge will be £5, payable in advance. He further coolly states that "no advertisements are taken." I wish I knew the name of this proposed reliable publication that I might acquaint your readers with it.

The annual meeting of the Social Science Association will be held this year at Birmingham from September 17 to September 24. This association has twice before met in this town—viz., in 1857 and 1868. The president for the year will be Mr. Shaw-Lefevre, the First Commissioner of Works, and the various departments will be presided over as follows: International and Municipal Law, Mr. John Westlake; Repression of Crime, Mr. J. S. Dugdale; Education, Mr. Oscar Browning; Health, Dr. Norman Chevers; Economy and Trade, Mr. Fowler; and Art, Mr. Beresford-Hope.

The following case seems to indicate the poisonous state of the waters of some of the English rivers. A woman, who had been drinking, threw herself, last Whit-Tuesday, into the river Irwell, near Manchester, intending to commit suicide. She was got out alive, but died last Sunday. At the inquest held on Wednesday medical evidence was adduced showing that the cause of death was not drowning, but resulted from the effects of swallowing the poisonous water of the Irwell, and a verdict to that effect was accordingly returned.

A serious plague of caterpillars has during the past week made its appearance in the mountainous districts of East Glamorganshire, Wales, and caused great anxiety and consternation among the neighboring farmers. From the description of the caterpillar it is presumably that of the buff-tipped butterfly, being described of a brown color, with black longitudinal stripes, and in length about one inch and a half. They came in such numbers as utterly to defy all ordinary attempts for their removal, and in many cases the mountains have been fired to get rid of them.

The Executive Council of the Health Exhibition has had recently under its consideration the advisability of opening the exhibition, or some part thereof, on Sundays, and during the past week it announced the final decision to keep the exhibition entirely closed on such days. Up to the end of last week 568,959 persons had visited the place. The evening fêtes attract great crowds, particularly on Wednesdays and Saturdays, when all the fountains in the grounds are illuminated.

According to the *North German Gazette* a deadly disease, described as a sort of bubo plague, is epidemic around Bagdad, on the right bank of the river Tigris. The prevalence of the disease was concealed for a long time by the Turkish officials, but they have at last enjoined quarantine rules. The disease is said to be very rapid, proving fatal in three or four days.

SAFETY-VALVE.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. II.

(Continued from page 98.)

ALL the drain and soil, as well as the "back-air" or vent-pipes, with their fittings, are of *extra heavy cast iron*, and were carefully selected and inspected before being dipped in tar. They were all tested when in place by filling the lines with cold water, the nearly horizontal pipes in the cellar receiving a pressure per square inch equal to about twenty pounds, which pressure, of course, decreases in a ratio of one pound per square inch to about every 27 inches of height in the rising lines, but insures a greater pressure at the highest fixture than it is possible to obtain with use.

On the cellar plan, in our last issue, the house-drain is shown approximately in true position, which is always near the walls. No pipe is underground or hidden, but all are carried on ledges on the walls, as shown on Fig. 5, or on brick piers with stone caps and iron cradles, as in Fig. 6.

Figure 5 is a detail of the main house-drain, etc., as seen in the boiler-room, at G, on the cellar plan. It is here the connection with the Sixty-eighth Street sewer is made, all parts of the pipe being above ground to the front wall of the boiler-room, which wall extends to the line of the curbstone at this point; *a*, in Fig. 5, is the 6-inch "house-sewer," which is furnished with a screw-plug *b* to give it a straight opening into the main sewer; *c* is the house-trap, also 6 inches, with its hand-hole; *d* is the foot-vent from the sidewalk near the curbstone, and *e* is the "house-drain." The pipe *f*, with its trap *h*, is at the point where the underground drainage from the foundation-walls enters the house-drain. The boiler-room is about four feet deeper than the cellar of the building, and is sufficiently below the subsoil drainage to permit the arrangement which is shown. At *h* is a door in the ledge leading to the trap and pipe in the wall to allow the engineer to inspect it, and keep it full of water should it be likely to evaporate. The boiler-room being below the sewer level, the hand-pump *i* is provided, and connected with a receiving basin under the flagstones, into which the underdrainage from these walls can run and be pumped into the sewer as shown.

Figure 6 is a detail under the butler's pantry, at E, on the cellar plans, and shows part of the main house-drain F, with its supports, the soil-pipe E, and the vent-pipe D. The arrangement, consisting of the box A, the trap B, and the pipe G, is to provide for the proper removal of the drip water from the ice-box in the butler's pantry, and is similar to the arrangement placed under the ice-house at I, the description of which will answer for both. A is a pine box, 12 inches long by 7 inches deep inside, and made of 1½-inch boards. It is lined with 6-pound lead, and provided with a stand-pipe *a*, which is fitted into the ground-ferrule *b*, which, together with the waste-pipe connecting with the trap B, are wiped into the bottom of the box as shown. The pipe G is the drip-pipe from the ice-box or ice-house, as the case may be, and is carried about two inches beneath the surface of the water in the box. This traps the pipe G, preventing a current of air from the cellar passing into the ice-box, and also separates the pipe from direct communication with the trap B or house-drain. To cleanse the box A, the stand-pipe *a* can be removed, allowing settlements, etc., to be washed from the lead into the sewer. A water-pipe not shown also terminates over the box A, to allow of flushing. The pipe C, from the top of the trap B, serves the double purpose of air-vent for the trap and to allow the condensation from the line of vent-pipe D to run to the house-drain through the trap. In other respects the diagram speaks for itself.

(TO BE CONTINUED.)

PERSONAL.

DURING the months of June and July information with reference to the Massachusetts Institute of Technology can be obtained by addressing Prof. W. R. Nichols, care of THE SANITARY ENGINEER, 92 and 93 Fleet Street, London, E. C.

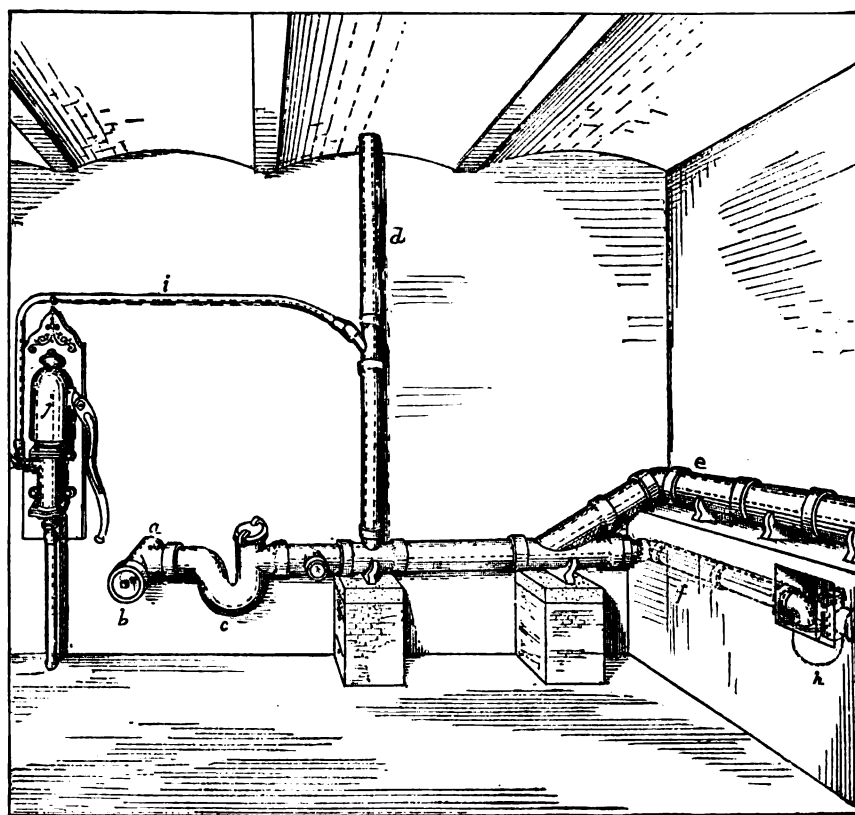


FIGURE 5.—DETAIL OF HOUSE-DRAIN.

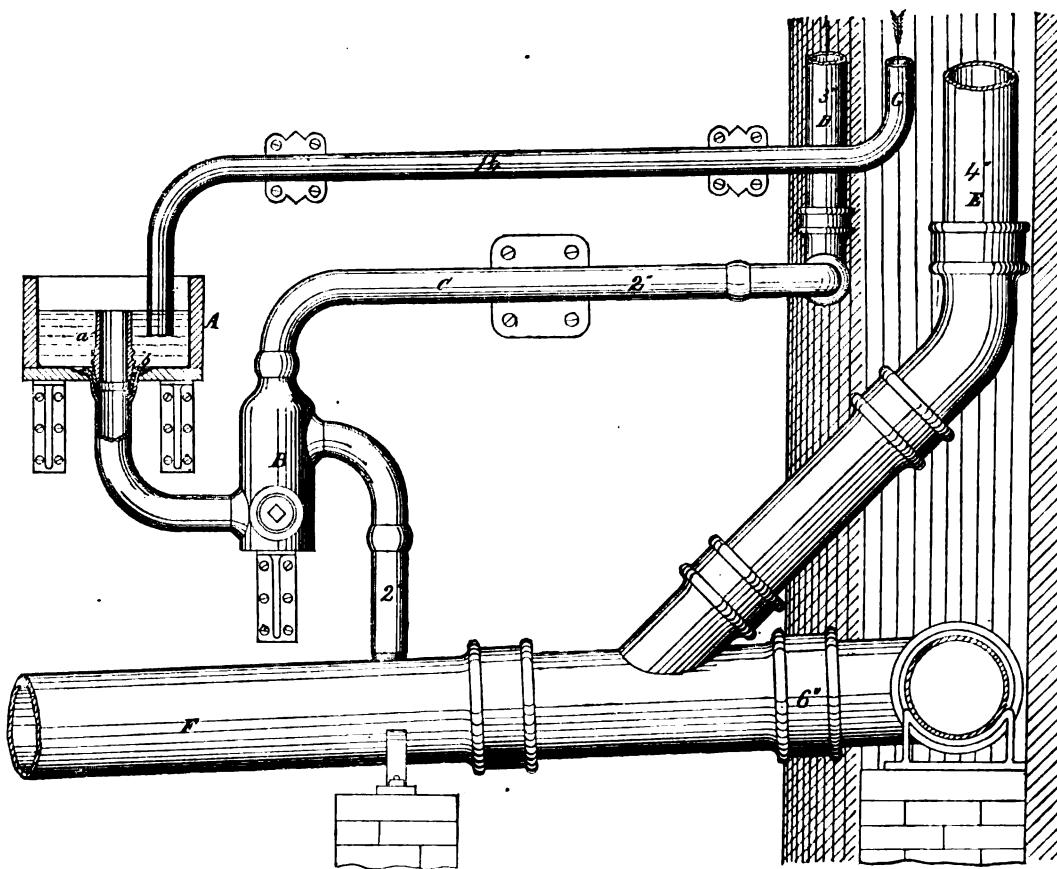


FIGURE 6.—MODE OF TRAPPING REFRIGERATOR-WASTE.

A MEDICAL VIEW OF THE PLUMBER.

AN opinion on the position of the plumber in modern sanitary progress from the medical standpoint is given by the *Hahnemannian Monthly* in the following words:

"Once the name of plumber was never mentioned without a sneer or a joke. Once the plumber was the householder's worst enemy. 'Scamped' work was the rule, and not the exception; joints were made in the clumsiest fashion, leaks were puttied, and the use of traps was practically discarded. Now, in every large city there is a master plumbers' association; there are discussions about the best methods of scientific plumbing; men who do disreputable work are frowned upon by their brethren of the craft, and the conscientious, educated plumber is one of the householder's best friends—working with the family physician in preventing as well as fighting disease. In New York and Philadelphia, possibly in other cities also, we now have schools for plumbing, where the trade is taught as it should be. The cities have adopted plumbing regulations which have done incalculable good, though yet far from perfect.

There are frequent arrests in New York for the violation of these laws, and plumbers and builders are now forced to obey the laws of health. It is not our present purpose to criticise these regulations, the defects of which will doubtless disappear in time, but to point to the fact that their very existence is one of the undeniable proofs of the advance of sanitary science."

THE Department of Inland Revenue of Canada has decided that tea-dust as an article of food is injurious to the public health, and cannot be admitted into Canada.

INSPECTOR MCLEAN, of the Brooklyn Board of Health, found twenty-five cases of pleuro-pneumonia in nine cow-stables in Brooklyn.

GOVERNOR CLEVELAND has received numerous complaints from the New York Sanitary Reform Association relative to the Hunter's Point nuisance. He has also ordered a strict quarantine of cattle afflicted with pleuro-pneumonia, and that the law relating to the slaughtering of infected cattle shall be rigidly enforced.

ON THE USE OF LEAD-PIPES FOR WATER-SUPPLY.

BY A. HAMON,

Member of the French Society of Hygiene, etc.

IN France since 1862 the use of lead-pipes for beer, wine, cider, and other liquids has been forbidden by order of the police. In 1879 it was forbidden to use lead in the paper called tinfoil, which is made use of in wrapping cheese, chocolate, tea, and in the glazing of earthenware (1874). It was also forbidden to make use of old wood from torn-down buildings in heating baking-ovens (1875); it was also forbidden to use lead in closing the holes in millstones used for grinding flour.

According to the statements of our best physicians, Chevallier, Tardieu, Gautier, and others, lead, even in the smallest possible quantity, is a source of great danger when it is daily absorbed, as is the case where water is distributed by means of lead-pipes. It is thus that the celebrated Rasori has written: "*The most remarkable accidents caused by lead are those where this substance is taken into the system in small quantities at a time, but repeatedly.*"

The layer which forms in the pipes generally consists of carbonate of lead. This deposit, almost insoluble in pure water, is readily dissolved in water containing ammonia salts, nitrites, nitrates, and organic matter; but all potable waters contain more or less of these bodies. It is the same thing with the phosphate and sulphate of lime, which dissolve in water containing organic matter. Moreover, this coating is detached in pieces by many shocks suffered by the pipes, shocks known under the name of "*coups de bélier.*" The lead-salts are thus more or less suspended in the water and we absorb them with the water. We cannot remove the lead suspended except by filtering the water over wood or bone charcoal. This filtering would not remove the lead in solution, for in order that the latter might be removed a chemical reaction is necessary, in order that the lead may be precipitated, either in the metallic state or as an insoluble salt. It is therefore certain that water contaminated by lead in solution may be filtered over charcoal without, by this means, being freed from the lead it contains.

When the lead-pipes are, as Professor Nichols remarks, alternately exposed to the contact of air and of water, the corrosion of the lead is more rapid. Yet this happens daily in the distribution of water, even where this is of so-called *constant flow*. Moreover, in provision for drainage and water-supply, use is made of large pipes of cast-iron, of lead tubes for upright lines and branches, and of copper taps; by the permanent contact of these metals a galvanic current is formed which greatly aids the attacking of the lead by the water. From this actual state of affairs, it is plain that the action which may be made to take place in experiments in the laboratory does, in reality, daily take place, only it is even more intense. If the injurious effects produced by such a state of affairs are not apparent, it is simply because we expect that *colic* should always be the result of lead *toxication*. We forget that the lead introduced into the system in very small quantity changes the inmost nature of our tissues, and injures the nutrition of our organs in consequence of chemical reactions which take place during the passing of the lead molecule through our organs. Then result cerebro-spinal and genito-urinary troubles, anæmia, dyspepsia, pseudo-typhoid fever, and other diseases of which, often, the origin cannot be traced.

From a sanitary point of view, judging of the habitual use of lead-pipes for the distribution of water, we cannot conclude that this method is without danger to health. In truth, experience from this point of view shows nothing less than that we certainly have no more to seek in this direction; no more progress to make. For hundreds of years man has lived without sewers, yet this has not rendered their introduction any the less a great advance in sanitary science.

In 1882, in Prague, Austria, on a report made by Professor Dr. Topper, the use of lead-pipes for distribution of water was forbidden. In 1876, the International Congress of Hygiene also forbade the use of lead-pipes for water.

As to Paris, Professor Nichols is mistaken in stating that the opinion of Bobiere is that lead-pipes are not injurious.*

In 1873-74, during the discussion of this subject at the Academy of Sciences, the chemists, Fordos, Bobiere, Mayençon, and Bergeret Marais, asserted that the potable waters do affect lead, contrary to the opinions advanced by Belgrand.

* This has greatly surprised me, for I have before me a report of this chemist concerning a serious case of poisoning through water from a pump, the pipe of which was made of lead.

At this time 907 physicians of Paris, and among them members of the Academy of Sciences, the Academy of Medicine, professors, and hospital physicians, requested that the use of lead-pipes be forbidden.

Later, in 1881, Professor Armand Gautier, member of the Academy of Medicine, made new analyses on the waters of Paris, and found measurable quantities of lead, which, though small, led him to declare that it would be desirable to no longer use lead-pipes, and as Arthur Hazlewood, member of the State Board of Health of Michigan, said in 1876: "The use of lead unprotected from the action of the liquid in contact therewith cannot be too severely condemned in all cases where the water or other liquid is to be used for food or drink."

THE DISPOSAL OF SEWAGE UNDER DIFFICULTIES.

THE time is approaching when inland communities will be compelled, for their own security and their neighbors' comfort, to take steps to get rid of their sewage without burying it in cesspools around their houses or turning it into the nearest stream. The difficulties they will meet are not few, and the obstacles not slight. Some idea of the trouble which is in store for them may be gained from a recital of the experience of the inhabitants of the Thames Valley. The sewage of London itself is under control of the Metropolitan Board of Works, and is conveyed by intercepting sewers to Barking, and there discharged into the river, eight miles below London.

The extensive and rapidly growing suburbs along the Thames outside of the limits of the Metropolitan District would be in the same condition in respect to their sewage as any other provincial towns were it not that Parliament had resolved that the Thames should be a pure stream, and as long ago as 1867 enacted a law that no sewage should be discharged into the river. This statute has failed of its expected effect, on account of its stringency and peremptoriness. All the towns on the Thames—and the number of separate parishes and boroughs is very great—have been trying for years to hit upon some scheme for disposing of their wastes in a manner satisfactory alike to the property-owners and to the Local Government Board.

To go back to the beginning of this agitation, it should be stated that in 1847 the ravages of cholera had called the attention of the Legislature to sanitation, and in 1848 the first law was passed "for improving the sanitary condition of towns," and another act placed London and its suburbs under a Metropolitan Sewerage Commission, which in 1850 had a plan prepared for carrying the sewage of Richmond to lands belonging to the Crown, but the Crown objecting, the sewage was turned direct into the river, the system of sewers costing \$100,000. The highest branch of the Government was therefore primarily responsible for inaugurating the wholesale pollution of the river, which by 1855 had become so great that the fish left the stream, and boating and bathing became impossible below Twickenham. It was this pollution which instigated the passage of the Thames Navigation Acts in 1866, forbidding the discharge of refuse into the Thames or any stream within three miles of it, from Cricklade in Wiltshire, 80 miles west of London, to Yantlet Creek, near the mouth of the Thames, and giving jurisdiction to the Thames Conservancy Board over this region, except that part of the valley occupied by the metropolis and presided over by the Metropolitan Board of Works, who have power to pollute the river as much as they please, provided they remove any deposits from its bed to the satisfaction of the Conservancy Board. By subsequent acts, up to 1878, the jurisdiction of the Conservancy Board is extended to ten miles on each side of the Thames.

As before stated, the peremptory notices issued by the commissioners in 1867 produced a sensation, and nothing more. The public was not educated up to the point of undertaking so radical a reform. Richmond applied to Parliament in 1869, and obtained an extension of two years, but all the plans suggested met with such determined opposition from the proprietors of the lands proposed to be taken for irrigation of sewage, that nothing could be accomplished. Projects for the union of several municipalities in disposing of their refuse were started one after another, and in succession fell through, mainly because every one was willing to deposit his sewage on his neighbor's ground, but objected to his own sacred precincts being encroached on. The upper Thames towns and cities have quietly gone on and complied with the orders of the board, and some forty disposal schemes have been carried out, but the municipalities near the metropolis are still fighting and still casting

their sewage into the river. But above the intakes of the water companies all the sewage has been diverted from the river.

A new project is now before Parliament, looking toward the combination of all the towns between Hampton and the city of London, a district already under the control of a joint board for the purpose of arranging for sewage disposal, embracing a territory twelve miles long and eight miles wide, occupied by several hundred thousand inhabitants. It is proposed to convey all their sewage to a point on the banks of the Thames at Mortlake, a short distance from Kew Gardens, and there treat it by chemicals which will deodorize it and precipitate the sludge, which will then be compressed into cakes for removal and use as manure, the purified effluent being turned into the river. The scheme has been approved by the Local Government Board Inspector, but it is by no means impossible, or even improbable, that it may in its turn be thrown out by the Parliamentary Committee, in which case the towns would have to start again, and go over the ground with interminable discussion and fighting.

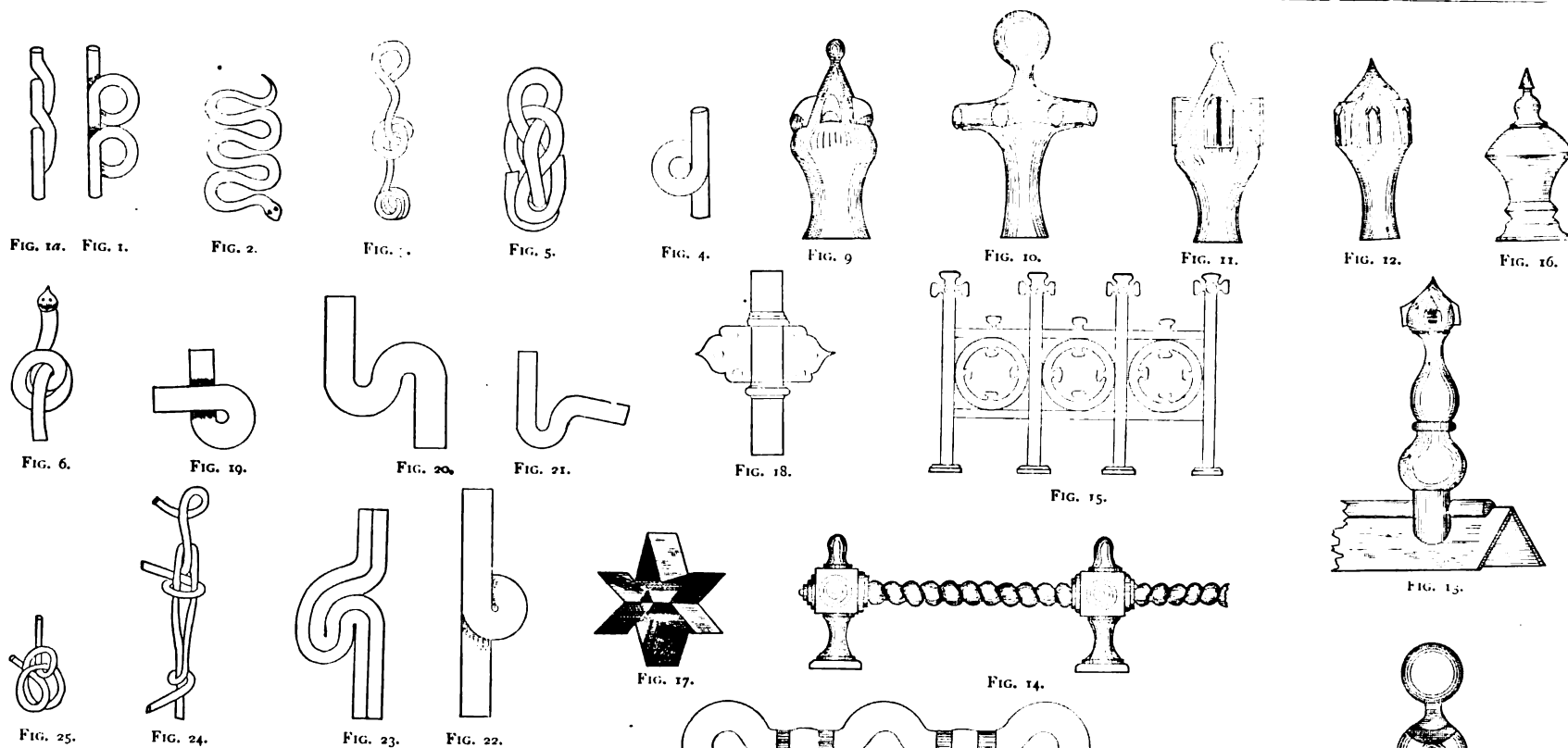
If it has taken these suburbs of London seventeen years to reach no conclusion when there are a number of successful disposal works near by them, what may we not expect in the way of delays from the suburbs of our large American cities, where there is only one example of successful efforts in actual operation—the one at Pullman? But it must come, and that soon, and we have enough confidence in American ingenuity and persistency to have great faith that the necessity will soon bring forth the invention which will make the purification of our sewage certainly feasible, and probably profitable.

INFECTION AND DISINFECTION.

To the newly-published report of the Medical Officer of the Local Government Board, the Waynflete Professor of Physiology at Oxford contributes a highly suggestive memorandum, in which he points out certain lines of investigation concerning infection and disinfection, which he believes to be full of promise. He extends the problem of disinfection far beyond the limits within which it has hitherto been confined. Not content with dealing with contagia as they exist in the external environment, he proposes to follow them up in the living organism itself, thus linking together two sets of questions which have hitherto fallen under the separate heads of preventive and curative medicine. Among the practical aims of disinfection, he includes not merely the action of the disinfectant on contagia before their entrance into and after their exit from the body, but the arrest or inhibition of their morbid action within the body itself. That our knowledge of the preventive action of chemical agents within the organism is still most imperfect, may be freely admitted. But it is not going too far to say that "there is no instance in which the contagium of any disease communicable from person to person can, after its introduction into the organism, be controlled or inhibited in its morbid action by introducing along with it an antagonistic drug." There are unquestionably strong reasons for thinking that syphilis may afford an instance of the kind; and that the remedial action of mercury upon its constitutional manifestations does really depend on a specific preventive influence exerted by the drug upon the virus of the disease. The hope that specific antagonists to the activity of specific contagia within the body, as well as outside of it, may be discovered, is thoroughly reasonable, and is supported by a variety of considerations. Indeed, some such discovery would probably have been hit upon empirically before now, were it not for the comparatively rapid course of the majority of communicable diseases, which allows but little scope for the operation of specific remedies requiring time to develop their action.

To direct systematic inquiry on this subject into a fruitful channel, Dr. Burdon-Sanderson, comparing the spontaneous determination of the morbid process in acute contagious diseases with the spontaneous subsidence of septic fermentations, ingeniously suggests that the phenomena in both cases may be governed by a similar law. Just as the self-arrest of septic fermentations has been shown to depend on the development in the fermenting medium of chemical compounds belonging to the aromatic group, which are hostile to any further manifestation of the vital activity of septic microphytes, so the terminable character of communicable disorders may possibly be due to causes of a like order acting on the media (blood, tissues, or both together), in which pathogenic contagia subsist and multiply. Should this hypothesis turn out to be correct, it is clear that we shall have some prospect of being able to check an acute contagious disease by hastening or by imitating the process of self-arrest.

It is satisfactory to learn, from Dr. Buchanan's introductory report, that sustained researches, on the lines just indicated, are about to be undertaken under Dr. Sanderson's auspices.—*British Medical Journal*.



THE INTERNATIONAL HEALTH EXHIBITION.

No. VII.

(Continued from page 98.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

EASTERN ANNEX—PLUMBING.

THOSE who are interested in plumbing-work can see some very good specimens of pipe-bending, lead-bossing, and joint-wiping on some of the stands.

On the stall of the West Central Sanitary Engineering Company, Manager Mr. W. Smeaton Senior, are shown good examples, chiefly made by their Mr. Medland. Figures 1 and 1a represent a piece of $1\frac{1}{2}$ -inch lead pipe, which is reported to have been made in 3 hours. Figure 2 is also made of $1\frac{1}{2}$ -inch lead pipe, and took a little longer to do. Figure 3 is made of $1\frac{1}{4}$ -inch pipe, and was finished in 10 hours. Figures 4 and 5 are from 2-inch lead pipe; the latter is reported to have been made in 15 hours. Figure 6 is of $1\frac{1}{2}$ -inch pipe, and was bent as shown in 9 hours. Figure 7 is made of a piece of 4-inch drawn-lead pipe. No solder is used with this excepting for the ball at the top. In the centre of the scroll is a ball bossed out of a piece of 7-pound lead. Figure 8 is a specimen of bending and joint-making. The middle leg A was worked out of a piece of 8-pound lead, so as to get the fork without the aid of solder.

Figures 9, 10, 11, and 12 represent ornamental caps for fixing on the tops of soil-pipe ventilators. These specimens are bossed from 7-pound sheet-lead, no solder being used, and are made hollow throughout, without the aid of a block, being simply reduced to shape by bossing with ordinary tools. Figure 13 is of a similar description, showing how a soil-pipe ventilator can be fixed on a roof so as to appear like a finial or terminal.

Figures 14 and 15 are samples of wood covered with lead for fixing as a balustrade to a coping or balcony, also used for cresting on the ridge of a roof. Figure 15 has the straight parts covered with lead pipe of a square section, and the ends of the horizontal bars are burnt to the standards.

Figure 16 is reported to have been bossed out of a piece of 4-inch lead soil-pipe in 4 hours.

On the stand of Mr. Whiteley (the "Universal Provider") are some specimens made under the direction of Mr. Macfarland, foreman of plumbers. Figure 17 was bossed from a piece of 7-pound lead, no solder being used. The extremities are 18 inches apart. The sides and centre pipe stand 6 inches high. It is equal in substance throughout, and a great many visitors are curious to know how the center pipe was worked up. Figure 18 is a neat design for astragals and ears for fixing lead soil and rain-water pipes. Figures 19, 20, and 21 are pieces of 2-inch, 3-inch, and 4-inch drawn-lead pipe, bent as shown.

PLUMBERS' LEAD-WORK AT THE INTERNATIONAL HEALTH EXHIBITION.

Mr. George Jennings, of Stangate, Lambeth, exhibits a specimen of plumbers' handicraft made by his foreman, Mr. George Davis, assisted by I. Vance and W. Evans. It consists of pieces of $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, 2, 3, and 4-inch drawn-lead pipe, bent and soldered as shown at Fig. 26. The soldered joints are clean and smartly made, and the bending is done very creditably.

Mr. Houghton, of Chelsea, shows some very good specimens of soldered joints and pipe bending.

At the stand of the Messrs. Bolding (No. 559) are some good specimens made by their plumbers, Messrs. Graham and Fleming. Figure 22 is a piece of 4-inch pipe bent to form a trap for fixing either vertical or horizontal. Figure 23 is a bag-trap made in two halves and with a soldered seam on each side. Figures 24 and 25 are pieces of 4-pound sheet-lead folded into a pipe, and then bent, the seam being left unsoldered. These are made so neatly that where the edges of the lead meet cannot be seen unless closely looked into. These men also exhibit traps made of $1\frac{1}{2}$, 2, $2\frac{1}{2}$, and 3-inch lead pipe of the same shape as Fig. 19.

As all exhibits must of necessity be fixed on the floor level, there is not much opportunity for showing really useful work, such as soil, ventilation, waste, and service-pipes and the usual plumbing fittings in a house. The only work that can be seen is chiefly lead service-pipes, with short branches to the various water-closets and other exhibits requiring water to show the advantages claimed for them.

A further description of the appliances exhibited by Messrs. Jennings, Bolding, and the West Central Sanitary Engineering Company will appear later; likewise of lead-work at other exhibits.

EAST CENTRAL GALLERY B.

On entering the East Central Gallery B, we notice the exhibit of E. Brooke & Son, of Huddersfield, Eng., and 148 Gresham House, London (No. 440), who show fire-clay cisterns of various sizes up to 200 gallons for artisans' dwellings.

C. G. Roberts, Haselmere, Surrey,* exhibits a rain-water separator (No. 416), designed to work automatically, and reject the first portions of the rain which falls, and which, of necessity, washing the roof, is much more impure than that which falls subsequently. It is, in general terms, a pivoted vessel divided into two compartments which directs the water first collected into the drain, and after a time cants over and directs the flow into the cistern. The size and details of the apparatus are proportioned to the extent of roof-surface, and are calculated to receive a rainfall of not over two inches per hour.

No. 441 is the exhibit of I. & M. Craig, Perceton Fire-Clay Works, Kilmarnock, Scotland. The exhibit shows Buchan's patent grease-traps and drain-traps, and also enameled porcelain sinks and wash-tubs.

Crouch & Jay, Maroon Street, Limehouse, London (No. 442), show galvanized-iron hot-water boilers and cisterns of various sizes.

J. & R. Howie, Hurlford Fire-Clay Works, Kilmarnock, Scotland (No. 443), exhibit fire-clay sinks, garden vases, cisterns, chimney-tops, etc.

William Ramsey, Farringdon Glass Works, London, W. exhibits glass cisterns of various sizes, the ball-cocks being provided with glass floats instead of copper.

* This apparatus is illustrated and described in THE SANITARY ENGINEER for November 16, 1882, page 518.

NATURAL WATER-COURSES FOR SEWERS.*

THIS pamphlet contains a report to the Board of Health of the city of Schenectady by the Committee on Drainage, Sewerage, etc., of the State Board of Health, together with a report by Dr. A. L. Carroll, the secretary of the board, and a map of the city showing the location of deaths from diphtheria and typhoid fever during 1883.

Dr. Carroll remarks that "Schenectady affords another of the many lamentable illustrations of the apparently ineradicable popular delusion that natural water-courses are the proper receptacles for sewage and house-refuse of all kinds. During the past year its mortuary record has shown thirty-three deaths from diphtheria, twenty-six from typhoid fever, forty-four from diarrhoea, and twenty from scarlet fever, many cases of the latter malady assuming a malignant type. With an estimated population of 15,000, these disorders have caused a yearly mortality of more than eight per thousand, whereas, it is generally conceded that, under ordinarily favorable sanitary conditions, the annual death-rate from the seven principal zymotic diseases combined should not exceed three per thousand of the population; furthermore, when it is considered that the deaths from such diseases represent a comparatively small proportion of the actual number of cases occurring, the statistical testimony gains greater force.

"To put the statement in a different light: Although we have not had accurate returns for past years from Schenectady, it is probably not far wrong to estimate the average annual death-rate at twenty-four per thousand, in which case over one-third of the total mortality would be attributable to four maladies which are intensified, if not directly caused, by filth poisoning." It also appears that there is a large amount of malarial disease in the place. In the report of the committee is a description of the drainage, which seems to be defective. The channel of the brook which runs through the city is silted up with mud and filth; several hundred privies empty into it. The banks are foul from house-slops and refuse, and the lowlands in the vicinity have become a swamp. Sewerage and drainage are the obvious remedies. We do not suppose that the Board of Health of Schenectady was ignorant of the dangers pointed out in this report, but we presume that the city authorities are unwilling to make improvements because they cost money, and that it was thought well to try the effect of a little moral suasion from the State Board.

We can assure the inhabitants of Schenectady that the sooner they raise money, employ an engineer, and set to work to remedy the evils pointed out in this report the better it will be for them, and if it is not done soon those who are prudent will leave the place and seek homes elsewhere. This appears to be a case in which the alternative is plain—clean up or clear out.

PIPE-CONNECTIONS TO BOILERS.

AT a meeting of the Executive Committee of the Manchester Steam Users' Association, held May 30, Mr. Leavinton E. Fletcher, Chief Engineer, presented his report, from which it appears that an inspector of the association in making an examination found that the safety-valve would not flow when relieved of weight, although there were ten pounds of steam on the boiler. At a pressure of thirty-nine pounds it suddenly began to flow violently, and subsequent investigation developed the fact that three weeks previous, a new rubber joint had been made under the safety-valve, but that the person in making the joint did not cut the centre out of the gasket, and that it did not burst until the pressure mentioned was attained. He cites another case where two men were killed in Liverpool by the bursting of a feed-water heater, in consequence of a rubber gasket not being cut out. The water was forced into the heater from the pump and the pipe that was stopped was between the heater and the boiler. The pressure was sufficient to burst the heater-tank.

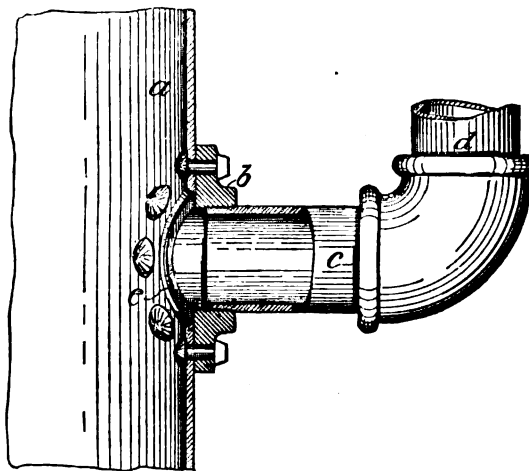
He also refers to a growing practice of using malleable iron safety-valve levers. These levers are nothing but cast-iron, made malleable, and may be defective through insufficient or improper manufacture, and it is certainly not a fit material for safety-valve levers. A case in point was the sudden breaking of one of these levers that looked like wrought-iron, deluging the boiler-room with steam and water.

In New York and the big cities, at the present time, nearly all flanges are riveted to the domes and shells

* Report on the Sanitary Condition of the City of Schenectady. (Extract from the fifth annual report of the State Board of Health of New York.)

of the boilers, and the safety-valves attached by screwed nipples; no soft joint being used inside the safety-valves or stop-valves. This prevents the necessity of a gasket between these valves and the boiler, and has been brought about through the annoyance of having to renew soft joints annually or oftener.

If instead of using India rubber, with its web of canvas or fibrous materials, asbestos cardboard is used for packing



flanges, the dangers cited, from the neglect to cut out the rubber, will be overcome, in consequence of the cardboard being softened to a pulp by the moisture of the steam or water, and at best having little sustaining power, being about of the strength of blotting-paper of the same thickness.

The method shown in the diagram is that now almost universally used in boilers for our large cities and by boiler-makers accustomed to doing that class of work.

GLASGOW WATER-SUPPLY.

THE special sub-committee of the Glasgow Water Commissioners to report on additional water-supply, states "that while the commissioners were entitled to draw 50,000,000 gallons a day from Loch Katrine under the Act of 1855, it had been found that tunnels would not pass more than 42,000,000 gallons per day. From this there fell to be deducted 4,000,000 gallons a day for the time required for the examination of and repairs on the aqueduct, leaving 38,000,000 gallons a day as the available supply for the city from Loch Katrine. To that quantity, however, there had to be added 4,000,000 gallons a day for the supply from the Gorbals Works, making the total available supply from both sources 42,000,000 gallons a day. The actual consumption of water in the year 1883 was on the average 38,900,000 gallons a day, thus leaving a surplus of only 3,100,000 gallons a day, which, at the present yearly increase of about 1,000,000 gallons a day, would not last out more than three years from the present date. The engineer stated that in these circumstances it would be necessary to extend the use of Deacon's waste-water meters over the greater part, if not the whole, of the existing area of supply, so as to tide the commissioners over the period that must elapse before any new work could be completed. The saving that would thus be effected could not be estimated at more than 7,000,000 gallons a day, and that would involve an estimated capital outlay of £43,000, and an additional annual expenditure of at least £1,000. The engineer further stated that it would be impracticable to enlarge the carrying power of the aqueduct, so as to increase the statutory limit of supply, and that to give that or an additional supply a second aqueduct would require to be constructed. The sub-committee had also before them the fact, stated in Mr. Bateman's report, that the total quantity of water which Loch Katrine would yield if completely utilized would probably be 70,000,000 or 75,000,000 gallons a day on the average, being only from 20,000,000 to 25,000,000 gallons a day more than the commissioners were at present entitled to draw from the Loch. Having regard, therefore, to the future growth and requirements of the city, it appeared to the sub-committee that it would be a question for serious consideration whether some other source in the vicinity of Loch Katrine should not be looked to for a supplementary supply. In these circumstances the sub-committee agreed to report that, in their opinion, an early application to Parliament for additional powers in connection with the water-supply was absolutely necessary; but before coming to any decision as to what powers should be applied for in the bill, the sub-committee

resolved to instruct Mr. Gale to prepare and submit for their consideration a report on the whole subject."

DINNER OF CANNED GOODS.

THE Twilight Club of this city, composed of professional and business men, who dine every week at the restaurant on the ninth floor of the Field Building, overlooking the Bay and Hudson River, on Thursday, June 26, gave a dinner in conjunction with the Canned-Goods Committee of the New York Mercantile Exchange, at which the bill of fare was made up exclusively of canned-goods. The invitation sent out by the secretary of the club was of a humorous turn, and stated that the object of the dinner was to demonstrate how great a variety of viands could be thus selected, and also to prove by a practical test their excellence and purity. We quote the concluding paragraph of the circular:

"Manufacturers in all parts of the country have sent samples of their products, including fish, flesh, and fowl, *vide* the inclosed *menu*. Invitations have been sent to health officers, chemists, and to all who are skeptical regarding the wholesomeness of canned-goods, to come and be poisoned like little men. Ambulances may be ordered at half-past nine. Physicians of both 'pathies will be in attendance. Autopsies, if desired, on the highest floor at the lowest terms. There will be a free and full discussion of "Food Production and Food Adulteration."

In response to the invitation nearly a hundred gentlemen attended, including representatives of leading firms in this city, Boston, Baltimore, Philadelphia, and Brooklyn engaged in packing or dealing in canned-goods, together with chemists, health officers, sanitarians, representatives of leading commercial journals and the daily press, besides lawyers, clergymen, physicians, two coroners, and a host of other genial fellows, all apparently ready to enjoy the viands, no matter what the consequence. The *menu*, which was elegantly printed and adorned with appropriate poetical effusions, contained no less than fifty dishes, including clams, oysters, a variety of fish, soups, salads, poultry, beef, tongue, ham, and an unlimited assortment of vegetables, fruits, and puddings. Among the most notable dishes were canned codfish-balls, Boston brown bread, deviled crabs, pigs' feet à l'Oscar Wilde, and Tabasco pepper-sauce à la dynamite (hotter than the hinges of Hades). The appearance of the tables was striking, every inch of space being occupied with appetizing dishes, while pyramids of cans were scattered here and there, and capped with glass jars containing really beautiful specimens of fruit and vegetables, which had a novel effect.

After the *menu* had been studiously conned for an hour or more, the chairman, Dr. Zachos, called the company to order, and introduced F. A. Barrett, editor of the *American Grocer*, who gave some account of the magnitude and history of the canning industry, which now amounts to 600,000,000 cans per annum. He was followed by Dr. Bartley, of the Brooklyn Board of Health, and James C. Bayles, editor of the *Metal Worker*, both of whom discussed the alleged poisonous character of canned-foods at length. Dr. A. N. Bell claimed that in cases where harm had been charged to canned-goods he believed it was through the contents having been rendered hurtful after the package was opened, and through carelessness in keeping the cans in unclean places. A letter was read from Col. Thomas Knox, who told of finding American canned oysters in the island of Java. Mr. Whyland, of Thurber, Whyland & Co., also sent a letter, and Alexander Wiley, of the same firm, spoke of the enormous export demand for American canned products in all parts of the world. Other speakers were Mr. A. Burbank, the humorist, George S. Page, Lord Ronald Gower, whose "reminiscences" have been recently published, Rev. J. H. Suydam, Gen. George W. Wingate, Leo G. Rosenblatt, and Prof. Kroeh, of Stevens Institute. In conclusion the chairman summed up the remarks of the different speakers, and showed how the development of the canning industry contributed to the comfort of mankind and the progress of civilization.

THE New York City Tenement Commission is preparing the blanks of inquiries which the inspectors will use as a guide in their inspections and fill out for the use of the commission.

THE Flatbush, L. I., Board of Health will make an inspection, jointly with Prof. Miller, of the United States Bureau of Agriculture, and Dr. McLean, of the Brooklyn Board of Health, of all the cow-stables in the town, to detect and put a stop to the feeding of swill to the cows.

PRACTICAL PLUMBERS ON THE FUTURE OF THE TRADE.

ESSAYS READ AT THE BALTIMORE CONVENTION, JUNE 26, 1884.

PROPER EDUCATION OF THE PLUMBER.

BY JAMES TUCKER, OF BOSTON.

THERE are few subjects entitled to more serious consideration than the proper education of the plumber. It was long ago demonstrated that the plumber occupies an important position in a community, from a sanitary point of view, and that his labors go hand in hand with the work of the skilled physician. There is no lack of material for the instruction and edification of the plumber. Books innumerable have been written upon the question of how to provide a healthy home, and the market is flooded with all sorts of sanitary devices. The quantity of literature printed having a bearing upon our profession is simply astonishing. Every plumber finds it in his daily mail, and it would require fully an hour every day to read over a plumber's mail matter on the one subject of the exclusion of sewer-gas. We all know that there is much written and printed which is of no value when put to the practical test. But yet there is much material at the disposal of the plumber which is of value, and by the aid of which he can help to perfect his knowledge of the trade and keep pace with the progress of the times. A distinguished writer has said: "All progress is not improvement, but yet how great is the real progress of the last half century!" The sentiment is applicable to plumbing. All progress is not improvement, and yet how great has been the real progress of our profession! A thorough plumber should have such an insight into his business as will enable him to discriminate between the progress and advancement which are real and that which is false. If he can do that, if he can advance in the direction which looks to the improvement of the public health, rejecting all theories which will not stand the test of practical application, he may be considered competent to impart information to those who are seeking to be instructed in the mysteries of the trade. The time has gone by for the jerry-builder to control house-plumbing and make the plumber the scapegoat. The demands of the time are such, and the advancement in the education of the plumber is so marked, that the responsibility of a job of plumbing now falls, and rightly, too, upon the plumber's shoulders. He is no longer ridiculed for that which a jerry-builder was responsible; and having this responsibility upon his shoulders, he deserves to be criticised if his work is found to be lacking in sanitary principles or to evince an inferior knowledge of the trade. To-day it is the sanitary plumber that is in demand; not the tinker, nor the Jack-of-all-trades, who advertises himself as a plumber, a painter, a glazier, and a carpenter. A man cannot master any trade in a twinkling, much less half a dozen of them combined in one. Such a man might have a spattering of all of them and yet be master of none. One important step, then, in the education of the plumber is to impress him with the idea of the high plane on which his profession stands, and that the knowledge which the plumber possesses, in a sanitary point of view, is all important, from the fact that upon him, as upon the physician, depends in a great measure the health of a community. When a plumber realizes this, and then does all in his power to carry these ideas to fulfillment, the advancing step has been taken in his proper education. Plumbers should ever be willing to listen to the counsel and suggestions of sanitarians—not the men who ride a hobby-horse, but the men whose study and experience make them capable of talking and writing understandingly upon sanitary matters. Plumbers should not allow their prejudices to stand in the way of the progress of their trade. They should be open to conviction, and ready at all times to receive instruction and learn something new. I do not mean by that that plumbers should seek to embrace every new theory that is evolved in this age, or set the seal of approval upon every new invention and appliance that is launched upon the world; but they should be liberal, not narrow, in their views; they should seek to go forward, not backward, and they should not cling with persistency to the customs of their grandfathers. A man who is not open to conviction, whose mind refuses to receive knowledge, is an object of pity, and is not destined to make progress in sanitary plumbing. No plumber can keep abreast of his trade if he educates his hand alone. The skilled hand is a good thing in its place, put without the educated eye and head it will not permit the plumber to keep pace with the age. A knowledge of joint-wiping and trap and pipe-fixing is good as far as it goes, but it is not of much avail apart from a knowledge of sanitation in plumbing. The principle of hygiene, the subject of hydraulics, etc., are of the first importance if you would be a sanitary plumber. In one way the plumber labors under a great disadvantage. The public know little of his trade, and much of his work being out of sight, it is often, even the best of it, unappreciated. It is a hard enough task for plumbers to obliterate the rooted prejudices which exist in their own ranks, and it may be too much to expect that they should seek to educate the public on the science of sanitary plumbing; and still they can do much in the way of eradicating antiquated notions concerning plumbing. It is a misfortune that the plumber is sometimes compelled to render a large bill for which there is little in sight to show. He may have purified air which was previously foul, and he may have reconstructed the entire system of the drainage of a dwelling, but the air is not visible to the eye, and so

he often fails to get proper credit for his work. But while the plumber labors under disadvantages such as these, he should never allow his work to be slighted in order that his patron's bill may be smaller. It is even a slower step to educate the public to the value of sanitary plumbing than it is the plumber himself. If plumbers are persistent, however, not in making out big bills, but in insisting upon doing work in a thorough, systematic way, and upon sanitary principles, in the course of time the public cannot but be convinced that it is false economy to carry out any system which is lacking in thoroughness simply to save a few paltry dollars to his customer. It is a happy circumstance that architects are turning their attention to the subject of house-sanitation. The architect should work with the plumber, and not against him, if good results in obtaining pure air, good ventilation, and sufficient light are desired. An architect who would violate every rule looking to the proper ventilation of a building places obstacles in the way of a plumber, while one who conforms to the regulations governing the admission of pure air and the escape of vile odors, contributes, with the plumbers, to the adjuncts of a healthy home.

THE PLUMBER AND HIS RELATIONS WITH THE ARCHITECT.

BY JAMES ALLISON, OF CINCINNATI, OHIO.

With a proper regard for the proverbial modesty of the workers in lead, we humbly submit that the modern improvements in the art of sanitation are due to the labors and experience of the long-suffering plumber rather than to the intellectual efforts of the artistic and skilled architect. The inference is therefore clear that in the onward march of sanitary science the time has arrived when the plumber should take his place in the procession to which he is by right entitled as minister in chief. The architect, however learned and skillful, may design palaces, and princes may have them erected, which but for the art of the sanitary plumber would become reeking hot-beds of disease and pestilence. It is to the plumber, and not to the architect, that all questions arising from defective drainage, sewerage, and ventilation are deferred, and, whether justly or unjustly, he is alone held responsible for the evils of bad plumbing, and too frequently made to bear the blame for the sins of others. Now, the grand object of the organized agitation of the subject by our guild is so far as possible to remedy the evils and elevate the sanitary art in behalf of the public as well as ourselves. Our desire is to render the plumber competent to meet the varied duties and responsibilities not only presupposed, but made necessary by the practice of his art. Our relations with the architect, builder, and doctor should be clearly defined, and each class be made to bear its respective burdens. Our present affair is with the architects, and our duty is to examine dispassionately the relations we occupy with them, and decide what changes are necessary, if any. Presupposing that the educated plumber is his own sanitary engineer, it is evident that to him will be referred all questions of drainage, sewerage, light, and ventilation, and especially the practical methods whereby the best results are to be entertained, all of which are but incidental in the studies of the architect, while they constitute the life and business of the plumber. The removal of the excreta and waste of cities is not left to the leisure and discretion of anybody, but is absolutely compulsory, and proper supplies of water are equally so, for reasons too obvious to require mention. The questions that we are called upon to answer, therefore, refer to the methods best adapted to promote the public health, on the one hand, and to counteract the evil results of a false economy on the part of ignorant plumbers, shoddy builders, and mercenary owners, on the other. It is no secret that one of the disabilities by which the practical sanitary artisan is often hindered is his false relations with the architect. An architect is not necessarily a plumber, and is seldom, if ever, practically familiar with the laws of sanitary science, and still less with plumbers' devices, methods, or materials. Yet the plans and specifications of a building are prepared by the architect without consultation with the plumber, who is expected to do the work, and who alone is held responsible for its efficiency, not only by the owner, but also by the public. Let us not be misunderstood here. With the architectural beauty of a building, or of the building materials of which it may be composed, the plumber has nothing to do. But with its water and air supplies, its sinks, closets, piping, drainage, and sewerage, he should have everything. It has been customary for the architect to plan a house, arranging the sinks, closets, piping, and so forth, according to his fancy, without reference to its sanitary correctness, economy, or expediency. The specifications for plumbers' materials refer, for the most part, to their appearance rather than quality, and the expense of a device according to specifications may be made to vary one thousand per cent. Some builders will take the whole contract to be executed under the supervision of the architect, according to plans and specifications. The builder sub-lets the plumbing to the lowest bidder, who, in order to save himself, puts his whole mind upon the arts of substitution and how not to do things, and still keep within the letter of the specifications. The chief sufferer in the affair is, of course, the confiding owner, who, perhaps, finds his costly and magnificent dwelling little better than a whitened sepulchre. He spends the rest of his life in repairs and alterations, and is fortunate, indeed, if he is able to save his family from malaria and his fortune from the doctors. It is demonstrated that twenty per cent. of the buildings in cities are replumbed annually. And the reasons are, that the plumber has too long permitted himself to occupy the position of the humble mechanic, asking leave to carry out the designs of his superiors as

cheaply and showily as possible, and is expected to submissively grin and bear the popular abuse heaped upon himself, and his art by those who feel outraged by somebody and make the plumber a scapegoat. Now, it is absurd to suppose that because time-honored the situation is irremediable. The plumber of the future will be required to conjoin his art to science, and elevate them both to the dignity of a profession, which will command the respect of the architect. The result will be that the architect will gladly avail himself of the advantages offered by the increased knowledge and experience of the plumber, and the sanitary welfare of the community will be enhanced a thousand-fold by the union. The difficulties before us should only stimulate more determined effort, and encourage us to the inspiration of a more harmonious co-operation between architects and plumbers. By this means public interest in the progress of sanitary science will be inspired, and the confidence of the people gained, it will be easy to secure a wise system of legislation in order to perpetuate and multiply the sanitary advantages we shall have inaugurated. Fortunately we are in some degree prepared for improvement. Not only the public generally, but architects, doctors, and plumbers have acquired through misfortune the rudiments of a sanitary education, whereby our contemplated evolution will be rendered easier. Owners of fine buildings, who have suffered in health, temper, and pocket from bad plumbing, will be ready converts to an improved system. Architects and the better class of builders will hail the advent of a new order of things whereby the excellence of their work will be appreciated and their profits rather increased than otherwise, while pretended plumbers, cheap builders, and pseudo architects will be compelled by law and improved popular sentiment to mend their ways, wheel into line, and join the sanitary profession. It is not necessary to point out the numerous and radical defects of present systems, or the causes by which they have been engendered and perpetuated. It is most probable that the real or fancied interests of the trade will interpose vexatious obstacles in the way of any change. But neither architects, doctors, plumbers, nor the thinking public disagree as to the existence of great sanitary abuses that cry aloud for reformation, and none dispute the fact that the proper education of all concerned is the rational course to be pursued. Educate the plumber by force of law if it cannot be accomplished otherwise, so as to enable him to execute a wise system of sanitary legislation, and all the rest will follow. To the master plumber will then be intrusted all matters pertaining to sanitary art, and the plumbing of buildings will not be planned without his counsel. Evil devices, inferior materials, and unscientific plans for drainage, sewerage, ventilation, and water supplies will be banished, because under a correct system, involving rigid responsibility, neither architect, builder, nor plumber can afford to make mistakes either through mercenary willfulness or criminal ignorance. One more point it is well to suggest. As the plumber's work is subject to especial criticism on all hands, therefore justice and common-sense under the coming dispensation will demand that no board of health, either national, State, or municipal, shall be complete without, at least, one master plumber. The architect will give us the plans, we will see to it that proper drainage shall carry away all noxious elements, and our friends, the doctors, may stand by and approve.

RELATION OF HOUSEHOLDERS TO PLUMBERS.

BY JOSEPH P. GALLAGHER, OF ST. LOUIS.

The skillful plumber is conceded to be of the same importance to the householder as the keystone is to the arch. The plumber is like unto the stone which the builders rejected—he has become the head of the corner, and, like the rejected stone, he is accredited with possessing merit to the builder and householder unknown. The plumber adds wisdom, strength, and beauty to the structure. He furnishes all the necessary appurtenances for the health, comfort, and convenience of the householder. Cleanliness being next to Godliness, the plumber is conceded to be one of God's special blessings to the householder, who exclaims, in the goodness of his heart: "Blessed, yea, thrice blessed be the plumber!" The constant tendency of the plumbers of the period, particularly in the United States, is toward the evolution of new features of interest and the conquering of new fields of usefulness. No other agency in the construction of modern dwellings has been so quick to embrace opportunities, so successful in keeping their profession not only abreast of the occasion, but also pushing beyond present conditions and finding chances of special conquest and development. Our profession has often suffered at the hands of its so-called friends. Like a sick man in the hands of quack doctors, it has been nearly killed sometimes by those who professed to be nursing it into a more vigorous state of health; and the only reason it has not gone down to a dishonored grave is because its life-power is beyond the range of the ignorant pretenders who have never served a day to learn the plumbing business, and are only plumbers in their own imaginations. This has been verified many times by a class of people who think if a man is good for nothing else he can commence to be a plumber and sanitary engineer, and try his power as a lecturer upon sanitary science. They have started on the career of plumbers and sanitary experts, but their small stock in trade has soon become exhausted, and they have proved failures, both practically as well as theoretically, and our cause has been injured through the incompetency of its advocates. There is no other question before the public that can compare with this in the magnitude of the results hanging upon its success or failure. This we claim can only be done by educating the rising generation of plumbers in the practical work of the craft, and at the same time,

it is necessary to give the young and rising student a thorough education in sanitary science; and with his practical knowledge of the work, aided by a thorough sanitary education, he is destined to become the *ne plus ultra* of the plumbing profession, and he will be the standard authority, and his advice will be sought by men of all professions and positions, lawyers, clergymen, and others. The plumber will be looked upon as the friend of God and humanity, and to the householder and the community at large he will teach such sound sanitary principles as only the noble, self-sacrificing, and practical plumber is capable of teaching.

THE SANITATION OF CITIES.

BY ALEXANDER W. MURRAY, OF CHICAGO.

One of the most powerful obstacles in sanitary progress is to be found in the landlord who is at the same time a capitalist. Sanitary improvements cost money. He may be willing to incur the expense in his own residence, but is rarely agreeable when the same care and outlay are demanded in the construction of residences for tenants. What is especially needed in this direction is the education of public opinion to a point where sanitary measures and laws are thoroughly understood; and then, if the rapacious landlord will not heed them, he should be forced to perform his duty by law. It is a suggestion worth considering as to whether it would not be to the advantage of cities to have the generation of power for the running of machinery located outside the limits, so as, by this means, to avoid the charging of the air with the products of combustion. An especial feature in which the French cities are superior to ours, and to some extent, also, the English towns, is in the provision of urinals on the principal streets. These should be provided, not only as a matter of comfort, but also as one of health. In addition to these there should be water-closets and bathing-places, the latter to be frequent in location and furnished to the public at a small cost, say five cents per head. In this way cleanliness of person would be cultivated, and this improvement would strongly reinforce sanitation in its application to the household and the street. Public parks play an important part in the sanitary welfare of a city. Within certain limits foliage plays no inconsiderable part in preserving the health of cities. In all cases a house which is surrounded by trees should have the latter so arranged that the sun can pierce through in spaces sufficiently numerous and wide to permit the sun to reach every portion of the house. There is much liability to infection from sewer-gas in the case of foods stored in basements and sub-cellars. The greatest care should be exercised in these matters, and wherever possible the ground floors should be covered with a rigid layer of asphalt or cement. Another thing needed about the house is something in the nature of a measurer of the purity of the atmosphere, and which should indicate its sanitary condition with the same certainty that the thermometer shows the degree of heat, or the barometer the weight of the atmosphere. Water, in plenty, in profusion, should be supplied in every city, and its plentiful use, not its waste, should be encouraged. Cleanliness is next to Godliness, and he is a good Christian who spares no pains to make his own residence a healthful and beautiful home, and in doing this not only sets an example to his neighbor, but assists in preventing the origin or the spread of unhealthful agencies. While there needs to be some common-sense hammered into the head of the citizen, there needs to be a good deal done to advance the learning and requirements of many of the workers in the field of sanitation, as well those who are directly interested, as those who, like the mason, the carpenter, and the plumber, have an indirect interest in securing the best sanitary results. There has been a decided improvement in our own profession. The time has passed when any plumber is willing to assert that he knows it all, or that when he left his apprenticeship he had been taught all that there is in the business. There should be among the technical schools, which are now becoming the fashion, a school for the plumber, which should teach him not only the practical details of his profession, but its theory, the mechanics connected with it, and such chemical knowledge as may be essential to securing an educated workman. At the same time the plumber is receiving the benefit of a training in his trade, there should be something done to educate, or at least to partially civilize the average owner. The plumber who is asked to do a thoroughly first-class job may be often met, but the one who is asked to do this, and at the same time is offered a first-class price for his labor, is the rarest of occurrences in the plumber's experience. Men who build will cut down everything which is not in sight for the sake of ministering to the eye. They wish something which they and the world can look at and enjoy; what is not to be seen is not regarded. The plumber is not a philanthropist; the very most he can do is to honestly put in a job what he is paid for it, minus a reasonable profit, and it is he who is cursed and not the wretched parsimony of the owner, when devastation and inconvenience follow the plumbing of a house. A duty the trade owes to the public, and which should be immediately agitated, is the establishment, by the authority of the State, of a board of examiners, to pass upon the qualifications of those who are to be granted a license for the purpose of practicing the business of plumbing. This board should consist of men who have a thorough knowledge of the theory and practice of plumbing. It is within the province of the National Association to prepare a memorial address to the United States Congress, suggesting the propriety of the United States Government appointing a commission of practical and scientific men, whose duty it would be to investigate the practice essential to the

perfect sanitary construction of buildings in the different sections of the Union, and to establish a sanitary code, based upon the experience thus learned, best adapted to a certain defined section. There should be no "scrimping" of the public's money whenever there is a demand for its use by a competent board of health. Perfect cleanliness of street and alley should be secured; nuisances should be as vigorously suppressed as if they were cases of cholera or small-pox. For this, money is needed, and it should be given. The family physician has a part to play in this drama of household life. It is he who more than all others can reach the comprehension of the heads of the family. He can point out the danger and insist on the remedy, and when he shall take his place in the happy trinity of doctor, architect, and plumber, then will the sanitary millenium have made its appearance.

NATIONAL ASSOCIATION.

PRESENTED BY THE MASTER PLUMBERS' ASSOCIATION OF PHILADELPHIA.

If we turn back a few pages of history, we come to the time when entrance to each plumber's shop was barred against other craftsmen in the business; when a plumber regarded every other plumber in his city or town as a bad workman and unworthy of confidence. Such a feeling among the fraternity gave color to the opinion which the general public formed of this trade; naturally, it concluded that as a class they were no better than they themselves had written. Therefore, said that public, it matters little what plumber is employed. It must be expected that the work will be done slovenly, and the bill must be paid without questioning its correctness. As a consequence, men put up signs to do plumbing who had not sufficient knowledge to carry on the business, and they thus brought additional discredit to the trade. All that the plumber's apprentice asked to know—in fact, the height of his ambition was reached when he could creditably wipe a round and branch joint, for then he could secure higher wages than his master was paying him by becoming a journeyman. Many of the employing plumbers in those days would admit each customer to the secrets of the trade, such as where to buy the goods, the lowest prices, etc. In fact, through his lack of intelligence or his necessities, he often accepted no more than journeyman's wages, where he ought to have had a living profit, and upheld the dignity of the trade. The consumers then commenced buying the material themselves and employing journeymen plumbers to do the work. We then find those not even pretending to be plumbers announcing themselves as sanitary engineers, and dictating to plumbers how they should do their work. The public began employing these sanitary engineers, and made the master plumbers mere journeymen to carry out their orders. Such was the condition of the plumbing trade a little over a year ago, when a few employing plumbers in New York City and its vicinity met together and concluded that something must be done to save the trade from disintegration. They called upon the material men for relief, and asked that they sell only to plumbers at trade rates, but their request was not granted. They then determined that the only way through which help could come was by organizing master plumbers' associations in the various cities and towns of the country, which they at once proceeded to do. Those associations were asked to send representatives to a National Convention of the Master Plumbers of the United States, for the purpose of devising some plan which would elevate it to its proper position among the industries of the country. That convention met—as fairly a representative body as ever met—to discuss what was the best course for those who sent them to pursue; but its most important work was organizing the National Association of Master Plumbers of the United States. Mark the results: Those who before it met treated almost with contempt the committee of master plumbers who called upon them to ask that justice might be done, after it had adjourned were willing to listen to and reason with the representatives of the National Association. They were brought face to face with the fact (which some of them had evidently forgotten) that all that they are the plumbers have made them, and there was danger that the organization of plumbers if not dealt with fairly might mean co-operation warehouses for the benefit of plumbers only. This much, gentlemen, has been gained already, and let us see to it that that which we have gained does not slip from our grasp. At all hazards, we must stand by the national organization and by our local association. But in doing so, remember that the work is not done; in fact it has only been begun, for in order to win back the respect and confidence of the public, the plumbers, as a trade, must deserve that confidence. How can they do so? Only by showing to the public that no one outside the trade knows as much about either the theoretical or the practical part of the business as those who are in it. Let each local association see to it that its members are kept posted, by means of libraries, lectures, and discussion among themselves, of the various practical plumbing questions which may from time to time arise; also let those same local associations have a care over the apprentices of their members, for they should remember that those who are to-day the apprentices will, in the next decade, give character and standing to the plumbing trade. Let us not forget that although the National Association has many friends who will work for its success, it also has enemies whose interests will be served by its dismemberment. It behooves us, therefore, to guard well its interests. Factional fights, whether between associations or among members of a local association, must not be permitted to destroy the harmony of our national organization, and thereby in-

terfere with the good work it has in hand. In conclusion, the Master Plumbers' Association of Philadelphia brings as her offering the formation of a trade-school for the instruction of plumbers' apprentices in such branches as they do not get in shops. Plumbers' apprentices, she says, for the purpose of the school is not to make amateur plumbers, but to provide for the future journeymen and bosses the trade can be proud of. The result so far is encouraging, and she suggests that her sister associations do as she has done in this important branch of the work.

OUR RELATIONS TO WHOLESALE DEALERS.

PRESENTED BY THE BROOKLYN MASTER PLUMBERS' ASSOCIATION.

There are few subjects in connection with the association movement which call for a more thorough understanding on the part of those interested than the relation which should exist between the plumber and the wholesale dealer. There is no greater mistake than to consider that there should be any latent antagonism between the two interests, although an idea exists that such a feeling is prevalent. These interests should be as identical as those existing between other departments of wholesale and retail trade. The plumber stands toward the manufacturer and dealer in plumbing material in the same light as the retail dealer in any other line of business, and should have his proper measure of protection in the matter of discounts and other trade usages. It does not follow that because the architect and builder may offer facilities for a certain amount of trade, independent, in a certain sense, of the plumber, that the latter is to be ignored. The manufacturer must still bear in mind that he is, to a greater or less extent, dependent upon the plumber for such an indorsement of his goods as will secure for them a preference over other goods of a similar character—an indorsement which should carry considerable weight on whichever side it is given. The facilities for an adverse decision are many. The practice in vogue at the present day among property-owners is to place the plumbing regulations of new and old buildings in the hands of some plumber of good judgment and ability. There is nothing easier, under such an arrangement, than to practice the law of retaliation upon the manufacturer who ignores the relations which should exist between him and the craft. Take the matter of water-closets or other sanitary appliances, we will say, and what is there easier than (where the plumber's indorsement is necessary) to transfer it to the goods manufactured by houses which deal honestly and fairly with the trade? It is only human nature to retaliate in this manner, and if the manufacturer so treated remains stubborn, it cannot be denied that while such a condition of affairs continues the plumber is, in a certain sense, justified in pursuing such a course. How long the warfare can last, so far as the manufacturer is concerned, can readily be measured by past experience, and that the folly of that course has already made itself felt may be readily inferred from the fact that the manufacturer and dealer in our city have established satisfactory and friendly relations between the craft and themselves on a basis which affords equal security and protection to both classes. The true relations, therefore, which should exist between the manufacturer and the plumber may be summed up in the words, *identity of interests*. There is no use in taking hold of any fine-spun theories in connection with this subject. Self-interest is the motive power which keeps all business machinery in motion; and, coming down to a solid basis, the true relation which should exist between the plumber and the manufacturer is that which will best secure a community of interest. So long as these two representatives of supply and demand recognize this principle, it is sufficient for all practical purposes, and will be found all-powerful in determining the obligations of the one to the other.

THE UNIFICATION OF THE CRAFT.

PRESENTED BY THE MASTER PLUMBERS' ASSOCIATION OF BALTIMORE.

Now that the success which will follow unity of action is admitted, the next question is, How is that unity to be attained? To solve this problem is just what was meant by the formation of the National Association one year ago, and in our deliberations we have been unable to find any plan which better recommends itself for "The Unification of the Craft" than that under which we are now working. Every one must be prepared to yield something for the common good; a spirit of conciliation must pervade our deliberations to induce that harmony which is essential to success. When any proposition is submitted to this body, let there be the fullest debate, and let each member advocate or oppose it to the utmost of his ability. But when the majority has declared its will, let the minority gracefully bow before it. Another important essential of success is singleness of purpose. Do not let us waste our efforts in the vain attempt to accomplish too many things at once; a few things well done are far better than many things ill done. Let us concentrate our efforts upon one thing at a time, and not leave it until it is finished, and then to the next, and thus we will be able to accomplish everything that is necessary and important for us to do. In conclusion, let us remind you, fellow-craftsmen, that, after all, it is to our individual efforts that we must owe success. All labor must be for the common good, and feel assured that when we do so that in the home of the industrious and capable mechanic plenty will ever remain. Respectfully submitted, John A. Wilson, John Trainor, John F. Dwyer, Committee of the Baltimore Delegation.

Correspondence.

REFERRED TO THE NATIONAL ASSOCIATION
OF MASTER PLUMBERS.

PROVO, UTAH, June 26, 1884.

To the Editor of THE SANITARY ENGINEER:

THE *Scientific American* notices the plumbing and drainage of Pompeii. Will you kindly mention, for the benefit of the Master Plumbers' National Association, the advisability of sending a good plumber, capable of making sketches and taking scientific observations in and about Pompeii and the other resurrected cities? No doubt the proper man could make his trip cost the fraternity little or nothing in the end, by giving the association right and title to a first-class illustrated book of descriptions of ancient craftwork. No doubt many competent craftsmen would be found willing to undertake the journey, and sufficiently intelligent to make the trip a success even in a financial point of view.

INQUISITORIOUS.

PURIFYING RAIN-WATER

PHILADELPHIA, June 16, 1884.

To the Editor of THE SANITARY ENGINEER:

WILL you please inform me what is the best method of purifying rain-water, for drinking purposes only, collected from the roof in an underground cistern? The dwelling-house is situated in the open country, in eastern Pennsylvania, and is occupied only during the summer season. The cistern is to be placed underground, to render the water comparatively cool, as under the special circumstances ice would be troublesome to obtain. It is proposed to build the main cistern of brick, cemented, placed near the surface, with an iron receptacle or boiler-shaped vessel placed at a lower depth, from which the water is to be pumped for use, the two cisterns being connected by a pipe. Filtration by means of an ordinary household filter, after the water has been pumped in, is thought undesirable, as the water would become warmed thereby if filtered slowly. A filter placed at the end of the pump-pipe, inside of the cistern, could not be inspected or cleaned as readily as it should. Would it be best to place a tank-filter in the brick cistern to purify the water before it passes to the iron vessel below, and if so, is there any filter suitable for this to be had in this country similar, for instance, to the tank-filters in use in England? Or, secondly, is there any automatic mechanical contrivance obtainable in this country by which the first gush of rain is rejected and prevented from flowing into the cistern? An arrangement of this sort was described in your journal of November 16, 1882, but it is of English make. Has any such contrivance proved successful up to present date? William Ripley Nichols says not, at the time his book on water-supply was written. At the particular locality referred to above well-water has proved *very undesirable*, on account of the character of the soil and rock by which sewage contamination can take place readily at long distances. What is the best method adopted where, as in the case of the high banks of the Ohio River below Cincinnati, well-water is unattainable except at great expense, and is the same to be recommended for undulating farm-land in this State not in the immediate neighborhood of any hill of considerable size? Any very considerable expense is undesirable, and the house is entirely unoccupied during about nine months of the year, and is some sixty miles or more from the winter quarters of the family.

I have written to you for information, because dependence upon a rain-water supply for drinking is very unusual in this part of the country, and very few probably have ever had any experience in it.

An early reply will greatly oblige,

Yours very respectfully,

A SUBSCRIBER.

[On page 176 of Prof. W. R. Nichols' book on "Water-Supply" a cistern with a partition filter-wall of porous brick is shown. Although Mr. Nichols says that such a partition "soon becomes clogged and covered on the outside with a deposit of organic matter," this is not the writer's experience. He has had in use for twelve years a filtering cistern of this kind, which has worked without interruption and given perfect satisfaction, the water being always pure, sparkling, and cool. There is no necessity for having the "iron receptacle" mentioned by our correspondent. In fact, the water will be better without it. The chamber into which the water passes through the filter-wall should have its bottom a little lower than that of the cistern, but need not be of any other material than brick laid in and plastered with good hydraulic cement. We do not know of any American automatic contrivance for switching off the "first gush of rain," nor is it necessary in a house in the open country. It is not likely that enough dirt will collect on the roof to injure the water. The only practicable way to secure good drinking-water, where well-water is bad, is to collect roof-water in cisterns, and filter it either as above described or by a household filter, which is rather tedious and laborious.

The English apparatus for separating the first roof wash has been improved, and is noticed in the course of our articles on the International Health Exhibition at South Kensington.]

SANITARY MATTERS IN TORONTO.

TORONTO, June 16, 1884.

SANITARY matters are fairly active in our midst. The newly constituted Local Board of Health has been fully organized, and is now in active operation. It consists of four Aldermen, the Mayor, and four raters, Dr. Pyne, Messrs. Meredith, Denison, and Alan Macdougall, Sanitary Engineer. The Medical Health Officer, Dr. Canniff, and Commissioner of Births and Deaths, Mr. Coatsworth, are also members. The Council has voted the board \$1,000 for this season's operations.

The board has determined to use the existing machinery by taking one policeman from each police district to act under the Medical Health Officer as a special sanitary inspector, and all the other constables are to be required to report all nuisances and infringements of the sanitary by-laws. The ward foremen are also to be instructed to do the same. The sanitary policemen, acting under somewhat similar instructions, did good work last year, and it is expected they will do better this year.

It is gratifying to notice a considerable growth of sanitary knowledge and interest in the city this year, and no doubt the new board will give a good account of itself at the end of the season.

The great cow-byre case, a *cause célèbre*, in which the Attorney General and certain residents in the east end sued Messrs. Gooderham & Worts, the great distillers, to abate certain nuisances alleged to arise from their cow-byres to the water-front in the eastern part of the city. The liquid manure used to flow into the bay, and, it was held, was polluting the waters. By the decision of the Court of Chancery the manure is to be collected into tanks, and the supernatant liquid is to be discharged westward into the portion of the bay now receiving the sewage of the city.

The condition of the harbor is bad enough already, goodness knows, and this new addition won't do it any good.

The plans of a new main sewer for the drainage of the western portion of the city are being prepared in the City Engineer's office. Mr. Alan Macdougall has been associated with the City Engineer to aid him in this work.

There is a good deal of building going on in the city, and all building trades are well occupied. A. M.

EXAMINATION OF LOCAL SURVEYORS AND INSPECTORS OF NUISANCES.

AT an examination of the Sanitary Institute of Great Britain, held June 5 and 6, twenty-three candidates presented themselves. The institute's certificate of competency to discharge the duties of local surveyors was awarded to W. H. Radford, J. B. Wilson, Charles Gilby, W. Tattersall; and to discharge the duties of inspectors of nuisances, R. Gibbs, G. W. Joblings, Kenneth Cameron, T. S. Ainge, T. Turner, R. Jeffery, J. Parker, J. Mallinson, W. A. Shadrake, W. C. Beck, T. Haslam, F. T. Poulson, J. Whyte, A. Sutcliffe, C. J. Easton.

DR. CARROLL, Secretary of the State Board of Health, has ordered the Town Board of Health of Flatbush to suppress the selling of milk from diseased cows, it having been discovered by the Brooklyn health authorities that pleuropneumonia exists in a cow-stable near the Brooklyn line. It is believed milk from these cows has been sold in Brooklyn, the owner, one Roath, defying the authorities of that city to interfere with him, as he is out of their jurisdiction. By bringing the Flatbush Board to bear upon him it is expected to close up Roath and check the business of buying diseased cows in Brooklyn, taking them to Flatbush, and sending their milk to Brooklyn people.

THE monthly bulletin of the New York State Board of Health for May shows the death-rate in New York was 24.41 per 1,000. The number of deaths was 2,761, of which 1,047 were of children under five years of age. There were 433 deaths from consumption and 393 from acute respiratory diseases. The rate in Brooklyn is 18 per 1,000; Long Island City, 27.23; Yonkers, 17.14; Newtown, 19.20; New Lots, 21.29. In the leading cities the rate was as follows: Albany, 20.83; Rochester, 17.94; Syracuse, 18; Utica, 20; Poughkeepsie, 21.38; Ogdensburg, 23.8; Schenectady, 21.6; Oswego, 13.5; Binghamton, 20.4. The highest rates were 51.25 in Summit and 42 in Milton.

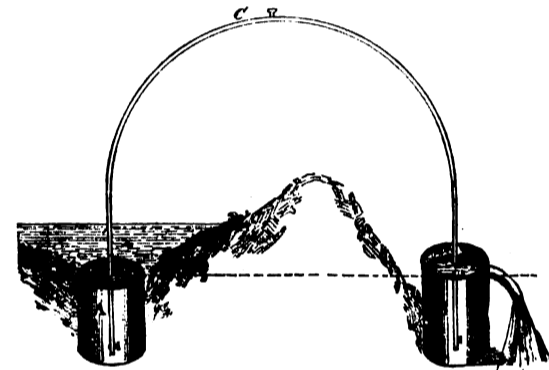
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

INTERMITTENT SYPHON.

A NOVEL form of syphon, with attachments, has been patented in England, whereby it is intended that a pipe-syphon will not lose its power to act whenever there is water in the reservoir, should the supply for a time cease, and that it will of itself begin again to act when the water rises in the reservoir.

The cylinders A and B are about nine inches in diameter by eighteen inches high, and are made of cast-iron. The legs of the syphon are carried down within these cylinders to near the bottom, so that the effect of evaporation due to a long drought will not uncover their ends in any reasonable time. In setting the cylinders the top of the cylinder A must be placed on an even level with the bottom of the spout in cylinder B. To charge the syphon, the cocks in the cylinders are to be closed and the pipe filled with water at C until all the air is expelled, when the tap, C, is to be restored. The cylinder, B, must be filled with water to



the point of overflowing, and, of course, A will be filled by being under water in the reservoir. If now the cocks on the legs of the syphon, near the bottoms of the cylinders, are opened, the syphon will run, provided that C is not higher than twenty-five feet or thereabouts from the top of A. Should the water in the reservoir be drawn down to the top of A, the action of the syphon will cease, but the syphon will remain charged unless air can enter it, which it is not likely to do if the pipe is light, the pressure of the air on the surface of the water in the cylinders keeping the pipe full.

The inventor is Mr. Thomas Herriot Tait, St. Leonard's Hill, Edinburgh, Scotland.

MEAT PIE.—A pleasant little story is related by a correspondent of an English agricultural journal. A few evenings back a constable at East Retford observed seven worn-out horses proceeding to the station from the direction of Doncaster. A cart accompanied them, in which were the carcasses of three dead horses. It was mentioned by a man who was with them that the whole lot were consigned to Hertford, where they were to be converted into meat pies for the London market. One of the animals could only breathe through a tube fixed in its throat.—*New York Sun*.

WE have noticed for some time past that sanitary matters in New Orleans are being discussed with unusual energy, and even acerbity, as though the city officials are not to be lightly moved to do that which they should. The Auxiliary Sanitary Association is especially outspoken. Dr. Chailé has lately said that New Orleans is the most unhealthy city in the Union, and the Rev. Dr. Holland, returning from a trip through the worst regions of the city, remarks that when he refers to the degradations of sin he will say they stink in the nostrils like Clio Street. Following up this vigor of speech, the society has sent to its members a circular requesting them to visit the streets in their several wards and report their condition to the secretary. If New Orleans is not put in a state of cleanliness it will not be the fault of this determined and outspoken association.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JUNE 28, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.																						
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.																										
NORTH ATLANTIC CITIES.																																														
Portland	Maine	35,000	7	10.4	1	14.2																																								
Boston	Mass.	435,000	159	19.0	54	33.9	13	1	28	1	4	8	2	3		2	4		8			1		3																						
Lowell	Mass.	71,500	21	15.3	8	38.0	2		2		2						1																													
Worcester	Mass.	69,000	20	15.1	9	45.0			3		3	1	1	1			2		1			1																								
Fall River	Mass.	67,000	22	17.1	11	50.0	1		2	1	4						2																													
New Haven	Conn.	69,500	25	18.7	7	28.0	1		3		2			1			1		1																											
Providence	R. I.	125,000	33	13.7	8	24.2	2		7		5		1	2		1	1			1																										
Total		872,000	287	17.1	98	34.1	19	1	45	2	20	9	4	7	3	11	10	1		2				3																						
EASTERN CITIES.																																														
Albany	New York	103,000	41	20.7	13	31.7	3		9		6			1			2		1		1			1																						
New York	New York	1,355,000	771	29.6	418	54.2	38	5	99	14	161	14	7	5	8	17	37		18		30	10		4																						
Brooklyn	New York	670,000	304	23.6	170	55.9	12		40	4	87	3	1		4	2	16		9	1	4			4																						
Hudson County	New Jersey	225,000	100	25.2	50	54.1	4		6	1	20				1	4	6		1	3		4																								
Newark	New Jersey	154,000	48	16.2	22	45.8	2	3	6	2	8	1		1					1			1																								
Philadelphia	Pa.	940,000	402	22.2	179	44.5	20	3	41	3	65	5	1	8	2	11	11	8	6	1	5		2																							
Wilmington	Delaware																																													
Total		3,447,000	1,675	25.3	861	51.4	79	11	201	24	347	23	9	15	15	34	72	10	38	2	40	19	2	9																						
LAKE CITIES.																																														
Buffalo	New York																																													
Rochester	New York	105,000	19	9.4	4	21.0	2	1	6		3			1				2			1																									
Cleveland	Ohio	210,000	53	18.1	23	43.3	4		4		6							2																												
Detroit	Michigan	140,000	59	21.9	27	45.7			4		4	4		4	3		4	1	1		1			1																						
Chicago	Illinois	650,000	245	19.6	136	55.5	11	3	16	2	30	9	2	5	3	2	7		11		22	2		2																						
Milwaukee	Wisconsin	147,000	48	17.0	30	62.5		2	4		2	1		1		3		1			1			2																						
Total		1,252,000	424	17.6	220	51.8	17	6	34	2	45	14	3	10	7	6	14	4	13		24	4		6																						
RIVER CITIES.																																														
Pittsburg	Pa.	210,000	87	21.5	46	52.8	7		7		18	4		2		1	4		4		5			2																						
Cincinnati	Ohio	275,000	176	33.2	94	53.4	8		23		44	2	1	1		1	5		2					3																						
Louisville	Ky.																																													
Indianapolis	Ind.	94,000	25	13.8	13	52.0	2		3		2			2					1																											
Minneapolis	Minn.	100,000	29	15.1	13	44.8	6		4		2	5					1			1	1			1																						
Evansville	Ind.	34,000	21	32.1	13	61.9	2		2		9		1	1					1																											
St. Louis	Mo.																																													
Total		713,600	338	24.6	179	52.9	25		39		73	11	2	6		2	10		8		6	1		6																						
SOUTHERN CITIES.																																														
District of Columbia	Wh	133,800	60	23.3	35	53.3	1		5		15				3		1							1																						
	Col.	60,300	56	42.1	44	72.5			8		25				1		1	1																												
Richmond	Va.	41,000	27	31.8	15	55.5		1	3					1	2				1																											
	Col.	32,400	19	30.5	9	47.3			4		5			1																																
Charleston	S. C.	25,000	9	18.7	4	44.4	1		1		1																																			
	Col.	27,800	27	50.6	9	33.3	1		2		1										1																									
Atlanta	Geo.	30,000	8	13.8	6	75.0	1			3	6													1																						
	Col.	20,000	20	52.1	10	50.0			3		8						2				2																									
Augusta	Geo.	20,000	8	20.8	1	12.5	1		1		1										1	1																								
	Col.	15,000	10	34.7	4	40.0		1	3		2						1																													
Nashville	Tenn.	35,700	11	16.3	4	36.3		2	3		1			1																																
	Col.	21,300	12	29.3	6	50.0			3		1	1					1						1																							
Memphis	Tenn.																																													
	Wh																																													
	Col.																																													
New Orleans	La.	171,000	110	33.5	30	35.4	1		10		13	2		2	4		1				4		1	1																						
	Col.	68,000	78	64.5	37	47.1	2		13		8	1		1		1	2				1		8																							
Total White		455,000	233	26.6	104	44.6	3	1	23		40	2		5	6	1	1	1	1		5	2	1	3																						
Total Colored		248,800	222	46.4	119	53.6	3		36		50	2		2	1	3	1	1	1		5	1	4	3																						
Total in 30 U. S. Cities		6,089,300	3,179	23.6	1,581	49.7	148	22	378	28	575	61	18	45	29	49	115	16	70	3	78	29	7	27																						
Total for 4 weeks, ending June 28		6,933,175	11,325	21.1	4,946	43.6	475	74	1553	112	1190	295	50	142	106	217	480	68	294	10	277	117	36	108																						
Total in 28 English Cities																								8,772,354	3,326	10.8			107				63	29		33		66					163		33	121
" 8 Scottish Cities																								1,254,607	548	22.7			19				20	7		5		11				17		28		
" 16 Irish Cities																								858,660	352	21.3			3		61		7			2		6				90		3	3	
" 139 German Cities																								8,911,046	4,398	25.7			117		692	24	338	123		50		53				60		1	54	
" 15 Swiss Cities																								455,537	193	21.9			5		34		18			14		1				485		1	3	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending June 28, 1884, in thirty cities of the United States having an aggregate population of 6,989,300, there were 3,179 deaths, which is equivalent to an annual death-rate of 23.6 per 1,000. This rate exceeds that of the previous week by 3.0, and the average of the month by 2.5. The main factor in the production of the increased death-rate is the great mortality among children under five years of age, principally from diarrhoeal diseases. In the North Atlantic cities the rate was 17.1; in the Eastern, 25.3; in the Lake, 17.6; in the River, 24.6, and in the Southern cities, for the whites, 26.6, and for the colored, 46.4 per 1,000. Of all deaths 49.7 per cent. were under five years of age, the proportion of this class of deaths being highest in the Southern cities among the colored—viz., 53.6 per cent.

Accidents caused 4.6 per cent., consumption 11.8, croup 0.8, diarrhoeal diseases 18.0, diphtheria 1.9, typhoid fever 1.4, malarial fevers 0.9, scarlet fever 1.5, pneumonia 3.6, bronchitis 2.2, measles 2.4, puerperal diseases 0.9, small-pox 0.2, and whooping-cough 0.8 per cent. of the total mortality. Diarrhoeal diseases caused 22.5 per cent. of all deaths in the Southern cities among the colored, 21.5 per cent. in the River cities, and 20.7 per cent. in the Eastern cities. Measles caused 5.6 per cent. of all deaths in the Lake cities. Deaths

from small-pox were reported in Philadelphia and New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 23 cases of diphtheria, 38 of scarlet fever, and 5 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 19 cases of diphtheria and 17 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 6 cases of diphtheria and 34 of scarlet fever under treatment June 28.

BALTIMORE, MD.—The Health Officer in his weekly report records 237 deaths, including 154 under five years of age. The annual death-rate for the whole population was 30.13 per 1,000, or 26.37 for the whites and 52.00 for the colored. Diphtheria caused 4 deaths, small-pox 1, scarlet fever 6, measles 1, whooping-cough 2, typhoid fever 3, malarial fever 3, diarrhoeal diseases 88, consumption 19, acute lung diseases 6, and violence 9.

MASSACHUSETTS.—During the week ending June 21, in 104 cities, with an aggregate population of 1,393,863, there were 402 deaths, which is equivalent to an annual death-rate of 15.0 per 1,000. The highest rates recorded were 22.3 per 1,000 in Newburyport and 20.5 in Boston. The principal infectious diseases caused 58 deaths, among which were diphtheria and croup, 14; diarrhoeal diseases, 14; scarlet fever, 10; cerebro-spinal meningitis, 8; typhoid fever, 6, and whooping-cough, 3. Diseases of the respiratory organs caused 36 deaths and consumption 83.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales for the week ending June 14, was 19.8 per 1,000. The highest annual death rate from measles was 4.8, in Plymouth; and from whooping-cough 2.5, in Sunderland. Small-pox caused 30 deaths in London, 5 in Liverpool, and 1 in Sheffield.

LONDON.—Births, 2,805; deaths, 1,450, which is equivalent to an annual death-rate of 18.8 per 1,000. Of the decedents 625 were under 5 years of age. The number of small-pox patients in the hospitals was 1,322, there having been 353 new cases admitted during the week. The number of fatal cases, however, showed a large decrease, numbering 30, against 60 for the previous week. Measles caused 73 deaths, whooping-cough 61, scarlet fever 33, diphtheria 24, typhoid fever 17, and 22 from diarrhoeal diseases. To diseases of the respiratory organs were referred 246 deaths, and to consumption 168. Different forms of violence caused 42 deaths.

SCOTLAND.—The Registrar-General's report for May gives the deaths in the 8 principal towns 2,511. This number is 166 below the May average of the last ten years. The lowest death-rate was 19.0 per 1,000, in Greenock; the highest 27.0 in Glasgow; the rate in Edinburgh was 22.0. Of all deaths 40.4 per cent. were children under 5 years of age; in Edinburgh the proportion was 36.0 per cent.; in Glasgow 41.9; and in Leith 49.1 per cent. Of the zymotic diseases, whooping-cough was the most fatal and caused 6.2 per cent. of the total mortality; in Edinburgh it caused 0.4 per cent. Measles caused 68 deaths, diphtheria 22, croup 14, scarlet fever 37, typhoid fever 21 and violence 85.

SCOTLAND.—The annual death-rate in the 8 principal towns during the week ending June 14, was 22.7 per 1,000, being 1.8 below that of the corresponding week last year, and 0.6 below that for the previous week this year.

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RUSSIA—*St. Petersburg*.—Week ending May 24: Deaths, 606; annual death-rate, 37.3 per 1,000. Small-pox caused 2 deaths, measles 58, scarlet fever 7, typhoid fever 17, diphtheria 16, whooping-cough 5, diarrhoeal diseases 97, and acute lung diseases 83.

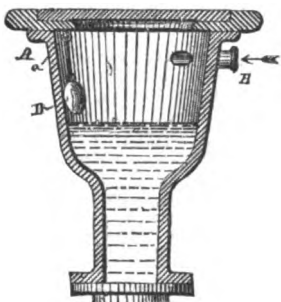
DENMARK—*Copenhagen*.—Week ending June 3: Deaths, 110; annual death-rate, 21.4 per 1,000. Whooping-cough and typhoid fever each caused 1 death, diarrhoeal diseases 9, consumption 23, acute lung diseases 12, and violence 3.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

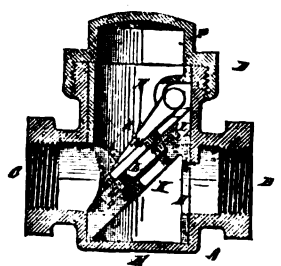
Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

294,788. DISINFECTOR. CHAS. A. CATLIN, Providence, R. I. Filed June 18, 1883. (No model.) Issued March 11, 1884.



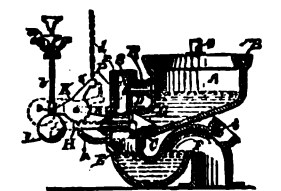
Claim.—As a new article of manufacture, the herein-described disinfecter, consisting of the solid deodorizing-ball D, provided with a length of cord or other suspending means secured to said ball, and adapted to be attached to the lid of a water-closet, substantially as set forth.

294,980. CHECK-VALVE. JAMES H. BLESSING, Albany, N. Y. Filed December 19, 1883. (No model.) Issued March 11, 1884.



Claim.—The combination, in a check-valve, of the removable frame O, supporting the valve-seat L on an angle with the passage through the valve, with the frame N, supporting the check-valve M and locking the frame O in the valve, and the cap P, closing the valve-casing and simultaneously locking the frames N and O within the valve, substantially as described.

295,010. WATER-CLOSET. STANTON M. HOWARD, Wheeling, W. Va. Filed March 13, 1883. (No model.) Issued March 11, 1884.



Claim.—1. The combination, with the basin A, of the discharge-pipe having an upper extension or chamber, P, and the horizontal overflow-pipe R, connecting said chamber P and the basin, and having the valve S, substantially as described.

2. The combination of the basin A, the discharge-pipe and trap, the horizontally-sliding valve and vertical pull-rod, and connections between the valve and pull-rod, which permits the valve to slide horizontally, and a connection between the pull-rod and flushing-cistern.

3. The combination, in a water-closet, of the bowl A, valve-chamber D, and trap F, with conical plug-valve G, valve-stem H, lever-pintle K, weight D, pull rod, chain d, and tank N, substantially as and for the purpose herein described.

294,789. DISINFECTANT. CHAS. A. CATLIN, Providence, R. I. Filed July 30, 1883. (Specimens.) Issued March 11, 1884.

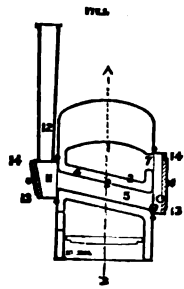
294,762. RATCHET BIT-BRACE. WILLIAM R. CLARKSON, Buffalo, N. Y. Filed October 5, 1883. (No model.) Issued March 11, 1884.

294,768. CONDENSER FOR AMMONIA ICE-MAKING APPARATUS. MAHLON S. CONLEY, Indianapolis, Ind., assignor of two-thirds to Thomas H. Butler and Orange R. Weaver, both of same place. Filed August 10, 1883. (No model.) Issued March 11, 1884.

294,771. HEATING AND VENTILATING DRUM FOR STOVES. JOHN FRANKLIN DAVIS, Altoona, Pa. Filed June 1, 1883. (No model.) Issued March 11, 1884.

English Patents.

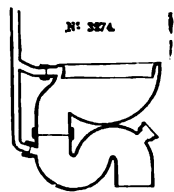
2,890. IMPROVEMENTS IN HOT-WATER BOILERS AND STEAM-GENERATORS.



This invention relates to vertical cylindrical boilers for heating water or generating steam, so designed as to afford great facilities for constructing or putting together its parts—large capacity of furnace and heating surface—full and convenient access to its fire flue or flues, for the purpose of cleaning, repairing, and replacing the same.

JOHN COLLIER, boiler-maker, and MICHAEL HOLKOYD SMITH, consulting and mechanical engineer, both of Halifax, in the county of York. Prov. Spec. June 9, 1883. Letters Patented December 8, 1883. (Price 6d.)

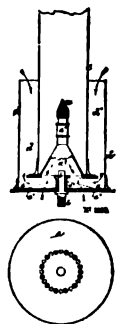
3,274. IMPROVEMENTS IN WATER-CLOSETS.



In addition to the ordinary flushing-rim of the closet or in place thereof, to provide in or near the trap an aperture through which, when the water is discharged to the pan, a certain proportion of it will be projected, and this water, being directed upon the trap, will rapidly cleanse it by carrying away all deposit, the scouring being more effectually carried out than is usually the case.

SAMUEL HENRY ADAMS, engineer, 54 Coney Street, York. Prov. Spec. February 14, 1883. Com. Spec. February 14, 1884. (Price 4d.)

3,984. IMPROVEMENTS IN GAS-BURNERS FOR CONSUMING A MIXTURE OF GAS AND AIR FOR ILLUMINATING AND HEATING PURPOSES.



The present improvements in gas-burners is for consuming a mixture of gas and air relate to that class of gas-burners described in the Specification of Letters Patent dated January 8, 1883, No. 105, in which induced currents of air were introduced to the pipe or chamber below the platinum wire-gauze burner, to mix with gas under pressure before reaching the burner.

JAMES LEWIS, 153 Brockley Road, Brockley, in the county of Surrey, engineer. February 26, 1884. (Price 6d.)

Association News.

TORONTO SANITARY ASSOCIATION.—On the 26th ult., a meeting was held in response to a request by Mr. Boxer, Secretary of the Dominion Sanitary Association of Plumbers, Architects, and others, for the formation of a local sanitary society. We can here only briefly note that the association was formed, with the following officers: President, Henry Langley; Vice-President, Joseph Wright; Secretary, Alan Macdougall.

CHICAGO MASTER PLUMBERS.—The Chicago Master Plumbers' Association met July 2, Thomas Havey in the chair as substitute for Vice-President Whitford, who, though present, was not well, and William Oliphant Secretary. The appointment of the standing committees was postponed until the next meeting. Three of the delegates to Baltimore, J. J. Hamblin, William Sims, and James H. Roche, put in an appearance, but President Andrew Young, of the National Association, was reported as not yet returned from the East. On motion of D. J. Rock, ex-President of the Chicago Association, it was resolved to give President Young a warm reception on his coming home, the date to be the next meeting of the association. The committee in charge, with full powers, are

Messrs. Moylan, Roche, Rock, and Havey. Then, in response to calls for reminiscences of the convention, Delegate Hamblin told about the journey east; how the Washington members of the fraternity received them at the depot, took them to the hotel, and courteously showed them all there was to see in the national capital, the sight-seeing extending to Mount Vernon and Washington's house, "where some of the boys took little relics out of it, and I got a piece of the foundation from under the building." "How did you get it?" was asked. "With his little hatchet," was suggested. Arriving in Baltimore they were met by another committee, and escorted to their hotel, and afterward the same night to the Baltimore Association's quarters, where they met with another enjoyable installment of the Maryland boys' unlimited courtesy and hospitality. The next morning they went into the convention, and from the reports in the papers all knew what was done, and that Chicago especially had no reason to complain. It was a good meeting, an improvement on that of the first year. Afterward the travels of some of the members, the speaker included, extended to Philadelphia, New York, Coney Island, and Glen Island. Other reminiscences of the meeting and the good time were told by Messrs. Roche and Sims.

DETROIT BUILDERS.—Several months since the architects of Detroit organized an association for the improvement of their profession, and now the builders have followed suit. At the meeting a constitution for the government of a builders' exchange was adopted and signed by thirty-four contractors and builders, and several of the leading architectural firms. The object is to incorporate the Builders' Exchange, the purposes of which are to adopt and adhere to rules which shall bring a uniformity in the business; to collect, preserve, and disseminate statistics; to settle all matters in dispute between contractors, sub-contractors, and employees. Rooms have been secured which will be fitted up with bookcases, reading and drawing-tables, telephones, files of THE SANITARY ENGINEER and other publications devoted to architecture and building. Briefly, the rooms will be the general down-town office of all contractors and builders.

The plumbers of Topeka, Kan., have gone into base-ball playing. One of the most remarkable games on record resulted a short time since from the struggle for supremacy of the men of the Kansas Plumbing Company, and the men of McCarthy & Sheahan. Score 31 to 21 in favor of McCarthy & Sheahan.

An interesting table of the residences of members of the late Master Plumbers' National Convention, held in Baltimore, shows that fifty-four live north and east of Philadelphia, thirty-six south of Philadelphia and east of the Allegheny Mountains, and fifty-six west of the Alleghenies.

Notes.

CONSTRUCTION.

THE NEWARK NUISANCE.—Mr. Alphonse Fteley, C. E., has made a preliminary report to the Special Committee of the Newark, N. J., City Council, on the nuisance created by carrying the sewage of a part of the city across the salt meadows in an open canal. He is of the opinion that no temporary expedient for flushing out the ditch would prove effectual, and that the only means of securing permanent and certain relief would be to pump the sewage up and discharge it into Newark Bay through an iron pipe. The cost of a reservoir pump and pipes he estimated roughly at \$400,000. There being several amateur engineers who think they have certain cures for the evil at less expense, the committee referred all their plans to Mr. Fteley for examination.

CLEVELAND, O.—The Board of Education has awarded contracts for the following work in connection with the erection of the Stanward Street School: Mason-work, Schulze & Young, \$10,752.75; Cut stone, Schlecht, Ost & Co., \$3,960; Lath and plastering, Thomas Tarbet, \$1,610; Carpenter-work, D. & G. Giese, \$8,060; Galvanized iron and tin-work, Cuyahoga Galvanized Iron and Cornice Works, \$687; Slatting, Auld & Conger, \$880; Painting, C. C. Gibson, \$933; Iron-work, T. H. Brooks, \$3,164; Heating, Chafer & Becker, \$4,253.49; Stock brick, Schulze & Young, \$250; total, \$34,550.24.

FAR ROCKAWAY, L. I.—Messrs. R. F. Mullins, James Gamble, and Charles M. Berran, comprising the Queens County Water Board, and others, have recently filed with the

County Clerk a consent to mortgage their property for \$40,000, and will begin building water-works for the village of Rockaway, to be finished by the middle of July. A well will be sunk and a supply furnished on the Holly plan.

PIPE-SEWERS WANTED.—The Board of Engineer Commissioners of the District of Columbia will receive proposals until July 31, 1884, for constructing 24,500 lineal feet of terra-cotta pipe-sewers, from 12 to 24 inches in diameter, and 51,600 lineal feet of brick and concrete sewers, from 2 x 3' to 20 feet in diameter, interior dimension. G. J. Lydecker, Major of Engineers, U. S. A., Engineer Commissioner, D. C.

NEW HAVEN, PA.—A number of New Haven citizens are organizing a company to furnish a supply of water from the reservoir of the Monell Coke-Works, two miles from the town. The corporation which supplies water to Connellsville has applied for a charter to furnish it also to New Haven.

BROOKLYN, N. Y.—The surveys connected with the proposed enlargement of the Ridgewood reservoir have been begun. They are in charge of Assistant Engineers A. C. Hendrickson, L. A. Clapp, and G. S. Roberts. It is proposed to double the capacity of the reservoir, a work which will require three years' time. The cost has been estimated at \$500,000.

BROOKLYN.—City Works Commissioner Fleeman has asked the Common Council to appropriate \$5,000 for preparing plans for the storm-sewers provided for in the bill which passed the last legislature.

NEW YORK HARBOR.—U. S. Senator Miller's bill for the improvement of New York Harbor authorizes the Secretary of War to invite proposals for deepening Gedney's Channel, through Sandy Hook bar, to the extent of five feet beyond the present available depth of water in said channel for a width of not less than 500 feet, and to enter into a contract for the completion of the work at a cost not to exceed \$1,000,000, and its maintenance at the increased depth for a period not exceeding ten years at an annual cost equal to ten per cent. of the contract price for the original improvement. The bill is identical with General Slocum's House bill.

MIDDLEBURY, N. Y.—The citizens are much interested in obtaining a water-supply. June 27 a public meeting was held on the matter. Parties from Hartford, Conn., offer to build the necessary works, and rent the water to consumers.

CHICAGO.—The contract is let to M. P. Gerity, for \$15,000, to build the sub-structure and approaches of Twelfth Street viaduct.

DETROIT, Mich.—W. G. Vinton & Co. have been awarded the contract for building the addition to the Public Library building. Their bid was \$31,910. Mason & Rice are the architects.

Gearing & Co. have been awarded the contract for erecting the new central office of the Fire-Alarm Telegraph, the contract price being \$5,000. The architects are William Scott & Co.

PHILADELPHIA, PA.—Bids were opened by the Public Building Commission for the fitting of the room to be occupied by the Police and Fire-Alarm Telegraph, and contracts awarded as follows: For the iron-work to Jones & Brenner, of Washington, at \$1,775; for the plastering to James T. Allen, at \$2,166; for the plumbing and gas-fitting to J. G. Thompson, for \$1,261; and for the slate skirting to J. F. Miller & Bro., at 54 cents per linear foot.

WOODS' RUN, Allegheny, Pa., is circulating a petition for the construction of a 10-foot sewer for that section of the city. Estimated cost, \$250,000.

CLEVELAND, O.—Thomas H. Linas has received the contract at \$35,000 for the masonry of the new court-house; the Cleveland Bridge and Iron Co., iron-work, \$21,000; Daykin Brothers, the plumbing, \$4,500, and Richard Warlow, the carpenter-work, at \$5,000.

THE GOVERNING BOARD OF THE CENTRAL LUNATIC ASYLUM OF VIRGINIA, located near Petersburg, has caused inquiries to be made with a view to the adoption of the most advanced methods of sewage-disposal.

DETROIT, MICH.—The city authorities having executed a contract with the Brush Electric-Light Company to light the city by means of the tower system, two citizens, stockholders in the Excelsior Electric-Light Company, have filed a bill in chancery, and applied for an injunction to restrain the city from carrying out the contract, on the ground that proposals were not received and the contract not awarded in accordance with the terms of the charter. The parties to the suit also ask that the Brush Company be enjoined from erecting towers in the public streets and places. No preliminary injunction was asked for, and the case will be tried on its merits.

The combination made by the brick-makers to uphold the price of brick has been broken, and a revival of building is looked for.

William Scott & Co. have been employed to prepare plans for new jails at Pontiac and St. Clair, Mich.

In the United States Court here a decision has been rendered by Mr. Justice Mathews in the case of the Hancock Inspirator Company *versus* James Jenks, affirming the former action of the court in which judgment was rendered for the plaintiff. This was an action for infringement of patent in manufacturing steam-injectors which were manufactured by Jenks prior to 1882. The form of the decree is to be settled hereafter.

Julius Hess & Co. have been employed to prepare plans for the following work: Store for O. Hessalbacker; cost, \$7,000; alterations to the residence of George M. Vail; cost, \$4,000.

G. & A. BARGAMIN have obtained the contract for heating the First Regiment Armory at Richmond, Va.

PROPOSALS for steam-heating of the Union school building in Wellington, Lorain Co., O., will be received by the Board of Education, W. R. Santley, clerk, until July 25.

The National Sewer Construction Company has filed a certificate of incorporation at Washington, D. C. The term is ten years and capital stock \$100,000. The trustees are Ammie A. Thomas, J. Ross Howard, W. J. Acker, and E. C. Manning.

AT the annual meeting of the stockholders of the Alliance Water-Works Company, held in New York on June 2, the following gentlemen were elected trustees for the ensuing year: J. A. Cloud, D. Runkle, R. E. Brewster, J. Jay Pardee, and E. C. Hine. At a meeting of the trustees held the same day, the board organized by electing the following officers: President, J. A. Cloud; vice-president, R. E. Brewster; secretary and treasurer, J. Jay Pardee.

GOVERNMENT WORK.

LIST of proposals received and opened June 28, 1884, by General M. C. Meigs, Supervising Engineer and Architect, for fitting up two toilet-rooms, furnishing and laying flooring, and for furnishing glazed-doors and window-sash for rooms of south half of lower story of the new Pension Building, on Judiciary Square, Washington, D. C.:

	Fitting up Toilet-Rooms.	Flooring.	Doors and Sash.
J. M. York & Son	.....	\$1,779 00	\$1,994 13
Frank Baldwin	.....	2,082 00	.....
J. A. Mockbee	.....	2,307 00	.....
John Lynn	\$2,194 92	.....	.....
James Ragan	1,447 90	.....	.....
Charles S. Smith	.....	1,899 00	2,567 00
Barber & Ross	.....	.....	3,974 00
James F. Brien	1,287 00	.....	.....
Alex. Duchay	.....	1,585 00	2,095 00
Notley Anderson	.....	2,250 00	2,460 00
R. G. Campbell	2,242 00	.....	.....

CUSTOM-HOUSE, ETC., KANSAS CITY, MO.—Synopsis of bids for iron and slate-work of stairways, received under advertisement dated June 5, 1884, opened June 26, 1884: Burnet & Co., \$5,783, 90 days; Haugh, Ketcham & Co., \$5,800, 3 months; Aetna Iron Works, \$6,297, 140 days; Poulsen & Eger, \$12,500, 14 weeks; McHose & Lyon, \$4,837, 4 months; Phoenix Iron Co., \$8,750, 85 days; Sneed & Co. Iron Works, \$6,450, 3 months.

FOREIGN NOTES.

THE Antwerp Universal Exhibition of 1885 will be divided into five sections: Public Instruction, Industry, Marine, Electricity, and Agriculture. The rent will be 70¢ per square metre for ordinary stalls, and for separate stalls 150¢. In the principal galleries 25 per cent. more will be charged. For the machinery showrooms the rents will be lower, and special agreements may be made.—*Iron-Monger.*

MR. ALFRED E. FLETCHER, of Liverpool, has been appointed Chief Inspector under the Alkali, etc., Works Regulation Act of 1881.

MR. SHAW-LEFEVRE has accepted the presidency of the British Social Science Association.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
July 5.....	24.79	17.43	21.72	28.63	27.63	18.46

E. G. LOVE, Ph.D., *Gas Examiner.*

THE Newark, N. J., gas companies have reduced their prices from \$2.50 to \$2.00 per 1,000 cubic feet of gas, the reduction beginning July 1.

A COMMITTEE of Philadelphia Councils is jaunting on an inspection tour of gas-manufacture. They have recently inspected the New Orleans Gas-Light Company's works, and the Edgerton system of manufacturing illuminating-gas.

THE Hudson River Steamer St. John has been furnished with Edison electric-lamps on quarter-deck, in kitchen, and in dining-room, as an experiment. The success has been sufficient to lead to the extension of the system to all parts of the steamer, and it will also be placed on the Drew, of the same line.

THE Brush Electric-Light Company, of Rochester, N. Y., have in use 1,100 horse-power from the Genesee Falls, which they own, and are now putting in wheels for 700 more horse-power. They propose to rent the additional power for manufacturing purposes. The company are now running 500 Brush arc-lights.

A DIFFERENCE of opinion between the City Council and gas company of Zanesville, O., over what ought to be the price of gas, left the streets without light for several nights. Out-of-town companies have made proposals for the lighting, and a Zanesville company, it is said, offers to supply it for five years at about one-half the cost hitherto.

WHILE workmen were laying a gas-main in Wheeling, W. Va., a short time since, and had filled the main with gas to test for leaks, the plug in the main was removed too soon, causing an explosion, as the escaping gas ignited at a plumber's lamp, where repairs were being made to a water-pipe in the same trench with the gas-main. Six men were severely injured.

JUDGE MORAN, of Chicago, has granted a temporary injunction against two landlords of that city, restraining them from removing the meters of the Consumers' Gas Company from certain of their buildings. The company states in its application for the injunction that it contracted last May with the tenants who have leased the buildings to supply gas to them at \$1.25 per 1,000 cubic feet. Accordingly meters and service-pipes were put in, and gas has been furnished. On June 25 the landlords ordered the meters removed within twenty-four hours, on threat of being taken out if not removed. The company asserts that it is usual for tenants to select the company they will take gas from, and that the action of these landlords would establish a precedent which would render any contract the gas company might make precarious, and would render the company liable to the tenant for breach of contract.

At the meeting of the Gas Institute in London, June 11, Mr. Robert Harris, in his address as President, after stating that the gas industry had been in a flourishing condition through the year, went on to say that reductions in price had been very general the past year in all parts of the country; in London the prices were now from 2s. 8d. to 3s. per 1,000 cubic feet (64 to 72 cents). Local authorities in whose hands was the supply of gas had likewise, in many instances, reduced the price. As to the electric-light, it had been proved that it could not compete with gas at the prices that ruled in England. Notwithstanding the failures which had taken place gas engineers must not ignore the fact that there was a source of artificial illumination which might come into competition with gas, and which doubtless would find its position alongside gas in certain places where its peculiar qualities rendered it more suitable, among which he noticed steamships.

Engineering states that Messrs. Woodhouse and Rawson, electricians of London, recently made application to the police authorities at Glasgow for permission to carry wires overhead or in tubes underneath the causeway, for the purpose of supplying electric-light in several of the leading thoroughfares. Several members of the Town Council and the Master of Works, who have reported on the subject, state that they did not consider that it would be advisable to grant liberty to lift the causeway of the public streets for any such purpose; and as the Government had decided to move for the appointment of a select committee of the House of Commons to examine into and report upon the whole subject of overhead-wires for all kinds of electrical circuits, they recommended that the request should in the meantime be declined, but that the question should be considered when the select committee had presented their report to the House of Commons.

THE *Pall Mall Gazette* says: "There seems some prospect at last that we shall have an early test of house-to-house electric-lighting. The South Eastern Brush Electric-Light Company, who for some time have supplied light to houses and shops in Colchester, yesterday made an installation for a general supply from a central station on the principle of storage. The managers of the company are confident of a commercial success. In fact, they rely upon a charge of a halfpenny per lamp per hour to yield a profitable return. When we are likely to get the electric-light in London at such a rate of charge seems very problematical. There are some men of considerable experience engaged in electric-lighting who admit that the laying of the mains and necessary apparatus in the metropolis, before the supply can be supplied, will cost £200,000 per mile. No wonder Mr. Hammond holds a strong opinion that what the electric-light companies want is more capital."

COMMISSIONER OF CITY WORKS FLEEMAN, of Brooklyn, has reported to Mayor Low that there are in that city 5,395 poles and 3,276 miles of overhead telegraph and telephone wires, and 6.54 miles of underground cables. Mayor Low had a conference July 2 with representatives of the telephone, telegraph, and electric-light companies, and the City Commissioners of Police and Fire. The opinion of the representatives of the companies was that it would be impracticable to enforce the law requiring the wires to go underground.

TRAVELERS' GUIDE.

THE National Railway Publication Co., 46 Bond Street, New York, has sent us their "Travelers' Official Guide of Railway and Steam Navigation Lines in the United States and Canada," and a very complete and useful work it appears to be. We notice among the features of the book, and in connection with the time-tables, a very convenient set of maps and a very useful list of railway stations in the United States and Canada. The book is sold for 50 cents.

AMERICAN PATENTS.

(Continued from page 129.)

- 294,244. FILTER. JAMES T. A. LEWIS, and CHARLES A. WOLFF, Boston, Mass. Filed May 14, 1883. (No model.) Issued February 26, 1884.
- 294,248. METHOD OF AND APPARATUS FOR SEPARATING DUST FROM AIR. JOHN M. MCINTYRE, Lockport, N. Y. Filed July 5, 1883. (No model.) Issued February 26, 1884.
- 294,278. FIRE-ESCAPE. CHESTER A. ROBERTS, Caledonia, N. Y. Filed June 29, 1883. (No model.) Issued February 26, 1884.
- 294,291. STEAM-GENERATOR. JAMES W. UPSON, Cleveland, assignor to James F. Upson, Shawnee, O. Filed May 22, 1883. (No model.) Issued February 26, 1884.
- 294,300. APPARATUS FOR SEPARATING LIQUIDS FROM GASES AND STEAM. WILLIAM H. WOOD and GEORGE RICHMOND, New York, N. Y. Filed February 20, 1883. Renewed January 26, 1884. (No model.) Issued February 26, 1884.
- 294,301. APPARATUS FOR PRODUCING AND BURNING GAS. LEVI D. YORK, Portsmouth, O. Filed January 14, 1884. (No model.) Issued February 26, 1884.
- 294,308. FIRE-EXTINGUISHER AND FIRE-ALARM. CHARLES E. BUELL, New Haven, Conn. Filed November 20, 1883. (No model.) Issued February 26, 1884.
- 294,319. FOLDING FIRE-ESCAPE LADDER. FERDINAND W. HOFER, New York, assignor to Eben S. Allen, Larchmont, N. Y. Filed April 17, 1882. (No model.) Issued February 26, 1884.
- 294,327. DEODORIZING AND DISINFECTING APPARATUS. GEORGE NOBES, 27 Dudley Grove, Harrow Road, County of Middlesex, assignor to John William Raimes, Acaster Malbis, England. Filed April 20, 1883. (No model.) Patented in England August 30, 1882, No. 4,138. Issued February 26, 1884.

294,339. PIPE-CUTTER. WILLIAM L. SWEETLAND, New Haven, Conn., assignor of one-half to Felix Chillingworth, same place. Filed November 28, 1883. (No model.) Issued February 26, 1884.

294,342. TILE-MACHINE. WILLIAM J. WOOLLEY, Hilliard, O. Filed December 8, 1883. (No model.) Issued February 26, 1884.

294,353. FURNACE. HENRY C. WILLIAMSON, Michigan City, Ind. Filed October 30, 1883. (No model.) Issued March 4, 1884.

294,311. IRON PAVING-BRICK. JAMES M. GLENN, Cincinnati, O. Filed June 18, 1883. (No model.) Issued March 4, 1884.

294,314. HYDROCARBON BURNER. WILLIAM LAMPAS GRIGG, Philadelphia, Pa. Filed June 11, 1883. (No model.) Issued March 4, 1884.

294,329. FIRE-ESCAPE. GEORGE R. JENKINS, Weston, Ky. Filed May 19, 1883. (No model.) Issued March 4, 1884.

294,335. EXTENSIBLE FIRE-ESCAPE. PAUL KINGSTON, Hastings, Minn. Filed May 5, 1883. (No model.) Issued March 4, 1884.

294,342. WRENCH. ORLANDO A. LEE, Mansfield, O. Filed January 10, 1884. (No model.) Issued March 4, 1884.

294,343. APPARATUS FOR GENERATING AND PURIFYING GASEOUS FUEL. SAMUEL LLOYD, Birmingham, county of Warwick, England. Filed November 4, 1881. (No model.) Patented in England June 25, 1881, No. 2,797. Issued March 4, 1884.

294,348. SOLDERING-TOOL. GEORGE A. MARSH, Brunswick, Me. Filed March 26, 1883. (No model.) Issued March 4, 1884.

294,354. STEAM-BOILER FURNACE. ISAAC I. MERRELL, San Francisco, Cal. Filed August 4, 1883. (No model.) Issued March 4, 1884.

294,376. PROCESS OF PRESERVING WOOD. WILLIAM W. ROBINSON, Ripon, assignor of one-half to George N. Lyman, Milwaukee, Wis. Filed August 31, 1883. (No specimens.) Issued March 4, 1884.

Claim.—The herein-described process of treating wood to render it fire and weather proof, consisting in subjecting it to a bath in a boiling solution composed of salt, quicklime, copperas, mineral paint, and sulphur mixed with water, subsequently drying the wood, and then coating it with a hot solution composed of mineral paint, as described, whitening, glue, and quicklime mixed with linseed-oil, substantially as specified.

294,778. VENTILATING DAMPER. JOHN P. DORR, Neenah, Wis. Filed June 25, 1883. (No model.) Issued March 11, 1884.

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b, brown stone; br, brick; br st, brick store; ds dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK.

Greenwich st, e s, from Desbrosses to Watts st, 6 1/2-story br and stone sts; cost, from \$180,000 to \$200,000; o, Henry Welsh; a, Geo. W. da Cunha.

127 Reade st, 5-story br st; cost, \$14,000; o, Thomas Wright; b, F. & W. E. Bloodgood and H. M. Smith & Son.

139 Reade st, 5-story br st; cost, \$13,000; o, Samuel W. Perkins; b, same as last.

38-40 South 5th av, w s, 125 n Bleeker st; 6-story br storage; cost, \$22,000; o, Gerolamo Cella; b, J. V. Close & Bro.

307 E 26th st, 5-story br ten; cost, \$15,000; o and b, Joseph Johnston; a, J. Bockell.

1448 Broadway, 7-story br and iron hotel; cost, \$70,000; o, Louis L. Todd; a, August Hatfield.

343 W 40th st, 5-story br ten; cost, \$18,000; o, Miss Ellen Fallon; a, H. Kafka & Co.; b, Thomas Brennan.

445 W 43d st, 5-story b s ten; cost, \$15,000; o, Rosa Jordan; b, J. Jordan.

520-522 50th st, s s, 275 w 10th av, 2 1/2-story br and b s ten; cost, ea, \$17,500; o, John W. Smith; a, W. R. Smith.

50th st, s s, 300 w 10th av, 2 1/2-story br tens; cost ea, \$17,000; s, Michael Whelan; a, Chas. Baxter.

9th av, s e cor 48th st, 2 1/2-story br and b s st and ten; cost, corner \$30,000, and other \$15,000; o, Louis K. and Louis Ungrich; a, M. L. Ungrich; b, day's work.

12th av, s e cor 34th st, 1-story br storage bldg; cost, \$15,000; o, B. Beinecke; a, Schwarzmann & Buchman; b, M. Eidlitz & Son.

2d av, w s, 50, 5 n 103d st, 2 1/2-story br ten and st; cost, ea \$9,000; o, a and b, John Baird.

80th st, s s, 158 e 4th av, 2 1/2-story b s front flats; cost, ea \$20,000; o, Hugh McGillivray and Peter G. Arnot; a, John C. Burne.

124th st, n e cor St. Nicholas av, 4 1/2-story br ten; cost, ea \$10,000; o, Abraham Benson; a, Bettinger & Lange.

125th st, n s, 175 w 1st av, 3 1/2-story b s front ten; cost, ea \$20,000; o and a, Wm. F. Burroughs; b, James Stewart.

Washington av, w s, 212.5 n Quarry road, 6 1/2-story fr dwells; cost, ea \$6,000; o, Wm. J. O'Brien; a, C. Baxter.

144th st, s s, 240 w Brook av, 2 1/2-story fr ten; cost, ea \$6,000; o, Ludwig Sommer; a, Adam Munch.

152d st, s s, 155 e Courtland av, 2-story br stable; cost, \$10,000; o, John Haffen; a, A. Pfeiffer.

Willis av, n e cor 144th st, 4-story br ten; cost, \$12,500; o, Christian Rieger; a, A. Pfeiffer.

BROOKLYN.

Adams st, w s, 177 n Myrtle av, 4-story br flat; cost, \$16,000; o, Charles D. Burwell; a, William A. Mundell; b, Thomas Dobbin and J. B. Jacobs.

178-180 Front st, 2-story br factory; cost, \$10,000; o, The Tin-Plate Decorating Co.; a, Wm. J. Fryer, Jr.; b, Richard Shapter.

Atlantic av, n s, 234 w Bond st, 6 1/2-story br sts and flats; cost, ea, \$6,000; o, Chester Bedell; a, Chas. E. Heberd.

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SUMMER DIARRHOEA OF CHILDREN.

THE season is close at hand when a great increase in the number of deaths of young children in our large cities is to be expected. The combination of high temperature with the conditions existing in such cities, and especially in those localities inhabited by the poorer classes, is certain to produce in such children diarrhoeal affections, which in many cases are fatal. Precisely why this should be the case we do not yet know, but there is reason to think that it is due to a combination of several causes, of which high temperature and sudden changes in temperature are most important. In England, it has been observed that summer diarrhoeas are especially prevalent in Leicester, although it is not hotter there than in many other towns. In the country hot weather does not produce this effect to anything like the extent which it does in towns, and it is well known that the removal of a young child suffering from this affection to the country is one of the surest methods of cure. In many cases it seems as if these summer diarrhoeas and certain forms of cholera-infantum were due to minute organisms, in which the high temperature has produced an unusual state of activity, and that cow's milk, as taken from the bottle, is the probable means by which these infective particles gain admission to the system.

Dr. N. S. Davis, of Chicago, who has given special attention to this subject, concludes, with regard to bowel diseases, that they are far more destructive to children than to adults; that they prevail almost exclusively during the warmer months of the year, and especially in that part of the United States north of the north line of the Gulf States and east of the Rocky Mountains, and that they usually occur in groups, corresponding with waves of high temperature, one of which usually occurs in the latter half of June, two or more in July, and one or two in August. A continuous high temperature has less effect than sudden variations.

While ignorance and poverty, producing uncleanness, overcrowding, and insufficient or improper food-supply, are also powerful agents in the production of this class of diseases, it must not be supposed that the children of the well-to-do classes, no matter how cleanly and comfortable their dwellings, escape these affections.

They chiefly affect children under two years of age, and are greatly influenced by the character of their food. Practical measures for the prevention of these diseases relate mainly to the regulation of the diet, the free use of cool water in the form of baths, and the affording of opportunities to the child to breathe pure air by excursions to the country or on the water. Of late years much has been done in this last direction by public charity, in providing the means for such excursions, the most extensive and complete organization for the purpose being probably the Thomas Wilson Sanitarium, of Baltimore, which, we believe, goes into active operation this summer.

For a large part of our city population, and especially for the tenement-house class, the precautions of most practical value are those connected with the food of the infant. This food should be milk—milk which has been preserved from contamination, which has not stood in open vessels in foul and crowded localities, nor been placed in half-cleansed nursing-bottles.

The mother's milk is best of all; next comes the milk of a wet-nurse, and next fresh and sweet cow's milk.

The special corps of visiting physicians organized by the New York City Board of Health to inspect crowded and unhealthy localities during the hot weather, has done much good by telling the people what to do, and by stimulating them to take some simple precautions. It is not, however, the poor alone who are ignorant and careless in this matter, and in many houses of those who would call themselves educated and well-off, the little ones sicken and die, because they are improperly fed, and not given a chance to get fresh country air.

OLEOMARGARINE AND SKIM-MILK.

Science, of Boston, commenting on the anti-oleomargarine bill, recently passed in this State, says: "Instead of courageously undertaking the proper restriction and regulation of substitutes, and the prevention of fraud, the city authorities, through the Board of Health, now supported by the State Legislature, propose to expel from the city markets all imitations of butter and all skimmed milk." It considers the exclusion of skim-milk as a worse measure than that prohibiting the manufacture and sale of imitation butter.

We fully agree with *Science* that oleomargarine and butterine, when made from wholesome materials and in a careful manner, are useful articles of food, the sale of which, under their proper names, it is unwise to prohibit. *Science* is wrong, however, in supposing that the New York State Board of Health has taken any part in originating or securing the passage of the law referred to. The measure was the outgrowth of an investigation made by the Senate Committee on Public Health. There was nothing in the testimony taken by this committee to warrant the prohibition of imitation butter; but as the bill was originated more for political reasons than anything else, the position taken on this question is no great surprise.

With regard to the sale of skim-milk in this city, experience has abundantly shown that the City Board of Health was justified in prohibiting its sale on sanitary grounds. No one will contend that skim-milk is not more or less nutritious, but it is impossible to insure its sale for what it really is. It lacks a very important constituent; and without going into any discussion of the question, on which we have frequently expressed ourselves, it is sufficient to state that skim-milk reaches the city about twenty-four hours later than though it was fresh. It is, consequently, so much nearer its souring point, and when used as food for children the chances are that it would sour on the stomach, and what nutritious elements it did contain would be lost.

ON SAND-FILTERS.

We print on another page extracts from a valuable paper by Professor William Ripley Nichols, giving the results of experiments made by him to determine whether there is any truth in the popular notion that water may be, to a certain extent, purified or deprived of saline substances held in solution by being filtered through a sufficient quantity of ordinary sand.

As regards organic matter dissolved in water, it is known that it is gradually destroyed by the action of the dissolved oxygen when the water containing it is passed for a long distance through

sand, but the action of a common sand-filter upon such matter is very slight, and Professor Pumpelly has shown that as regards living micro-organisms such filtration has practically no effect.

Professor Nichols shows that the action of a sand-filter upon dissolved saline substances amounts to nothing, and that experiments heretofore reported in which it seemed as if a portion of the dissolved salts was removed from the sand gave this result, because the sand was not perfectly dry.

In a sanitary point of view this is a matter of some importance, because this process of sand-filtration is going on on a large scale in the majority of villages in this country, the liquids filtered being derived from privy-vaults and cess-pools, and containing organic matters and saline substances. It also shows that the fact that the level of a well of fresh water near the sea-shore may vary with the tide does not prove that the water in the well comes from the sea, but merely that the tide causes a periodical obstruction to the flow of the ground water, which is the real source of supply.

The great objection to a sand-filter, whether it be in portable form to be attached to a cistern or other source of supply, or in the form of immense sheets or beds, as laid down by nature, is that it gives a false sense of security, and leads people to neglect precautions which are just as important when it is present as when it is absent.

It will be remembered that the Governor failed to approve the amended Food Adulteration Law. As no provision was made for this work in the Supply Bill, the Board of Health has no funds for the enforcement of the original law. In view of this fact, the board, at a meeting held in this city on June 28, adopted the following resolution, which ends the board's rather fruitless efforts at enforcing an adulteration law:

"Resolved, That inasmuch as the functions of this board in regard to inspection of oleomargarine have been superseded by recent legislation, and inasmuch as no appropriation has been made for the payment of experts under the general law to prevent adulteration of food and drugs, the corps of experts employed by the board is hereby discharged till otherwise ordered."

A PLEA for the retention of wells in Brooklyn, shown to be impure by the analyses made by the Department of Health, was advanced by temperance advocates last week. Dr. Raymond, Commissioner of Health, pointed out the proper way in which the advocates of temperance could advance their cause by increasing the number of public hydrants from which pure city water could be obtained. He would petition on their behalf that the additional hydrants be erected.

PERSONAL.

THE Board of Health of Philadelphia organized for the year on July 6, by electing General Sickles, President, and Mr. Hirsh, Secretary.

DR. J. BERRIEN LINDSLAY has been elected Secretary of the Tennessee State Board of Health in place of Dr. C. C. Fite. Dr. J. D. Plunket is President.

DR. BEACH, Inspector of the New York State Board of Health, has found eleven persons suffering from trichinosis in Arietta, Hamilton County.

NEW YORK STATE BOARD OF PHARMACY.—The following persons are members of the New York State Board of Pharmacy, by appointment of Governor Cleveland: Alfred B. Husted, Edward S. Dawson, Jr., Curtis H. Haskin, J. Hungerford Smith, and Clark Q. Otis.

MR. J. K. BROWN, State Dairy Commissioner, has appointed a number of inspectors to look after the milk-supply of this city, and vigorous efforts are being made to prevent the introduction of an adulterated article. The commissioner will limit his work to an inspection of the milk as it enters the city, leaving the city health department to look after the supply as sold at retail.

OUR BRITISH CORRESPONDENCE.

THE SANITARY ENGINEER at the Health Exhibition—Cholera in France—Sewage-Works at Madras—Action of Germany and Austria to Prevent the Introduction of Cholera—Czar's Contribution to Sufferers from Inundations in Poland—Opening of the Central Institute of Technical Education—A New Disease—Eloquence and Sewer-Gas—Sir Joseph Bazalgette's Inaugural Address.

LONDON, July 5, 1884.

THE editorial references in the *Pall Mall Gazette* and *Lancet* to THE SANITARY ENGINEER exhibit at the "Healtheries" of tenement-house plans and of printed matter explaining the method of enforcing the plumbing and tenement-house laws of New York seem to have excited considerable interest. The editor of THE SANITARY ENGINEER, yesterday, on invitation, gave evidence before "The Royal Commission on the Housing of the Working-Classes," on the powers of the New York Board of Health, the working of the tenement-house acts, and the past and present state of the problem in the city of New York.

The alarm in France at the outbreak of cholera in Toulon and the respect for scientific attainments seem to have overcome the prejudice of the French against the Germans, as instanced in their employment of Dr. Koch, of Berlin, chief of the recent cholera commission in Egypt, to investigate the cause of the recent outbreak in Toulon.

Within the last three months there have been three reported cases of woolsorter's disease (anthrax) in Bradford. Previous to 1880 there were numerous instances of the disease, "Van mohair" being at that time regarded as the most dangerous to sorters, and most productive of disaster. In 1880 Mr. Speal, the Local Government Board Medical Inspector, visited the town and ordered certain precautions, the carrying out of which was attended by good results for the time. The present outbreak is attributed to other classes of mohair—Cape of Good Hope, Turkish, etc. The coroner of Bradford insists on an inquest and investigation in every case, and it is hoped that the precautions now being taken will soon cause the stamping out of the disease.

The recent fire at Hampton Court Palace has caused the authorities to make more efficient provision for the protection of the palace. The First Commissioner of Works has just given instructions for hot-water apparatus to be placed throughout the state apartments, and has ordered the present stoves to be removed.

The new sewage-works at Madras, India, were opened by the Governor, Mr. Grant Duff, last Monday. In his speech at the ceremony, he said Madras, in his opinion, wanted nothing but sanitation to make it an agreeable place of residence throughout the year, and he was happy to open these works, being, as they were, a step in the right direction to insure an improvement in the sanitary condition of the town.

Vigorous steps are being taken in Germany and Austria for the prevention of the introduction of cholera. The Vienna Small-pox Hospital has been cleared in preparation for possible cholera patients, and in order to facilitate a more thorough inspection, the whole district has been divided into forty-three medical districts.

The Czar has contributed 200,000 roubles to help to alleviate the distress caused by the recent disastrous inundations in Poland. In one district of Posen alone 60,000 acres are under water, and the crops have all been more or less destroyed.

The Central Institute of Technical Education, at South Kensington, was opened by the Prince of Wales, Wednesday, the 25th ult. The architect of the new building is Mr. Waterhouse, and the cost of the structure up to the present has been over £75,000. In this building instruction, by selected and tried professors, will be given in all branches of technical education. The Livery Companies of London have contributed largely to the cost of the undertaking, and have promised material assistance for the support of the staff of professors and assistants, for the maintenance of whom a large sum will be annually required.

According to the *London Medical Record*, a new disease has been discovered. It has been met with in Siberia, where it is known under the name of "Miryachit." The person affected is seized with an irresistible desire to imitate everything he sees or hears. A like disease is known in Java under the name of "Lata."

The following bit of fine writing is a *verbatim* copy from a small pamphlet published in praise of the "Parcæan" system of disposal of sewer-gas by cremation, which is on view at the "Healtheries," the vulgar term for the International Health Exhibition, to distinguish it from last year's "Fisheries":

"In later years eminent Scientists have proved that the Zymotic diseases are engendered by the organical action of sewer gas and its exitial associates; that its virulent properties are generated and propagated in myriads by the exposure of milk, broth, meat, or any moist medium containing animal, fishy, or farinaceous matter to its pestilential influence; any of these (*sic*!), if introduced into the human system, begets every form of Zymotic disease.

"The medley of gas, recognised as sewer gas, is always incorporated with an exceedingly minute vapour fume that has hitherto baffled every attempt at analysis; this vapour is supposed to be protoplasmic, and the matrix of all the ills engendered."

If any sanitarian has not read Sir Joseph Bazalgette's inaugural address to the Institution of Civil Engineers, he should at once procure a copy of the seventy-sixth volume of proceedings of that institution, just published, in which the whole of it appears, accompanied by a series of tables of the very greatest interest. Among other valuable information will be found the following particulars appertaining to eighty-one of the principal cities of the world—viz.: population, number of houses, ratable value, length of streets, length of sewers, water-supply, daily and per head, sources of supply, annual rainfalls, quantity of refuse off streets per annum, cost of cleansing streets, dust and refuse removed from houses, police employed, number of vehicles, length of tram-lines, abattoirs, lighting, annual death-rate, etc. Altogether it is a marvel of careful compilation which can be studied with advantage by any one.

SAFETY-VALVE.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. III.

(Continued from page 121.)

THE illustration, Fig. 7, is a view in the kitchen of the Marquand house.

The boilers A and B are respectively the "Croton" and "tank" boilers shown in the diagram Fig. 3, page 96, issue of July 3, which diagram is illustrative of the system of piping used in the distribution of the hot and cold water.

The letters used here to indicate the parts are the same as those used in the diagram, and a comparison with it will familiarize the reader with the system and assist him to compare the disconnected parts.

The position of the kitchen is over A, cellar plan; the chimney-jambs corresponding to the position of the range shown in the cut, from which the position of the boilers and the sinks can be readily ascertained.

The "Croton" water-pipe, *m*, 1½ inches in diameter, is taken from the general cold system in the cellar through the floor at *m*, passing up and entering the boiler A at *m*, on top. The "tank" water-pipe, *k*, also 1½ inches in diameter, comes through the floor from the tank-main in the cellar, entering the boiler at the top. Between the "Croton" pipe, *m*, to the boiler, A, and the tank-pipe, *k*, to the boiler, B, is a ¾-inch pipe, shown by dotted lines and furnished with a stop-valve and check-valve, *a'*. The object of this pipe is to allow water to pass from the Croton-pipe, *m*, into the tank-pipe, *k*, thence to the tank-boiler, should the water-supply from the tank be interrupted or should the tank be run empty. The passage of the water from the tank-pipe to the Croton-pipe is, of course, prevented by the check-valve, which only opens upward and which is kept to its seat when water is in the tank by the greater pressure. The pipe *f* is where the hot water leaves the Croton-tank for low distribution. Upward from the boiler it extends into a header (*f*), composed of 1½-inch nipples and tees, from which the pipes *f*³ extend to the different points of distribution, such as butler's pantry, billiard-room, servants' bath, and all points in basement and first floor, and to the "cut-offs" of the different risers to the second floor. In like manner the hot-water pipe, *l*, from the tank-boiler, B, extends into a header, *l*, from which the pipes *l*¹ either run to the fixtures on the third floor or to the "cut-offs" of the risers for the second floor. The pipe *f*¹ is the warm "Croton" supply to the kitchen-sink, and is stopped in the pipe at the *star*. The pipe *m*¹ is a branch of the pipe *m*, and is the cold Croton water-supply to the same sink, stopping at the same *star*, the pipes being connected in this manner above the sink for the sake of a symmetrical appearance. In

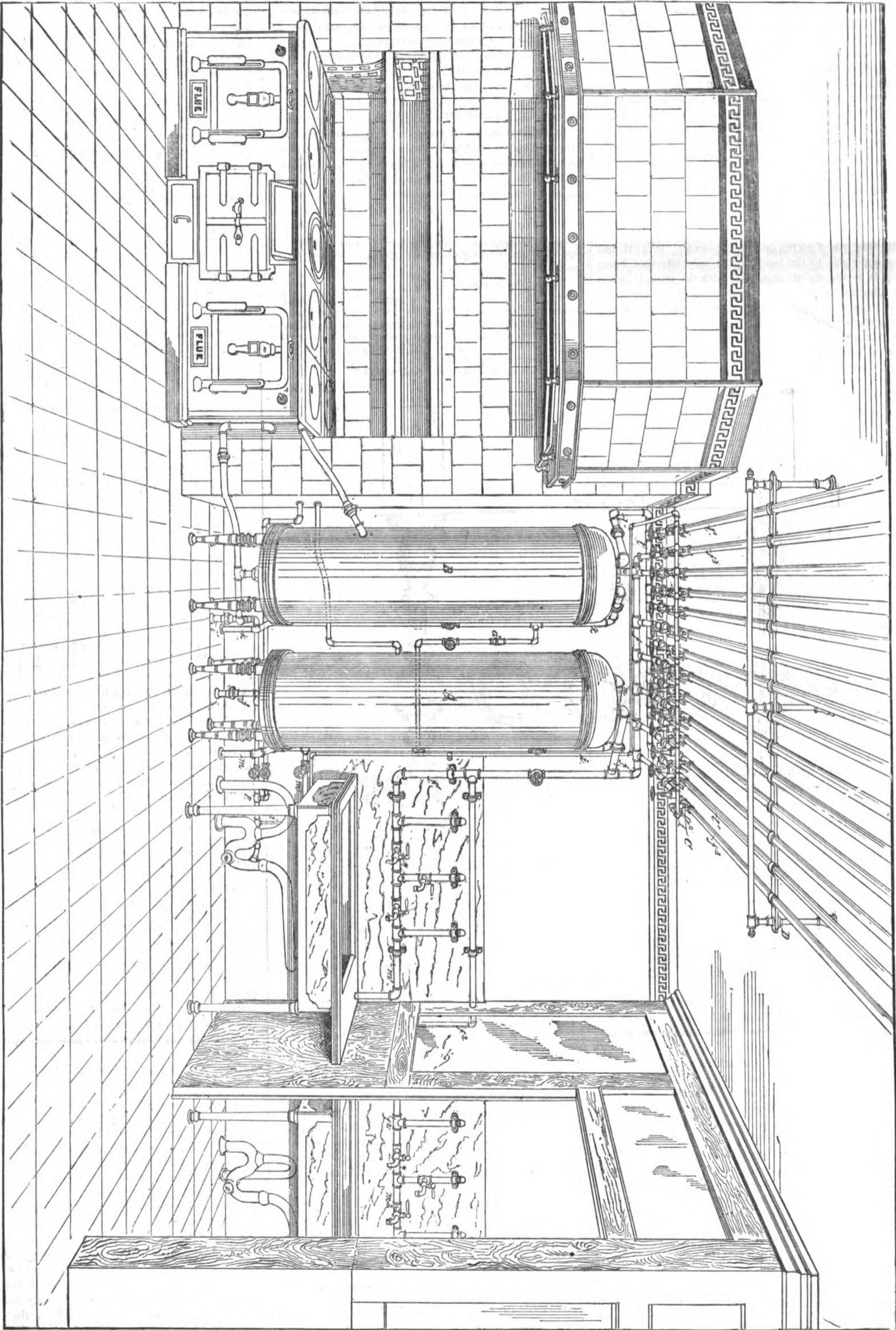


FIGURE 7.—KITCHEN IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

like manner the pipe f^3 conveys warm water to the pantry-sink, the pipe m^3 being the cold supply, the $star$ being the dividing point, as before.

The pipe j is the return-circulation pipe to the Croton boiler, while l performs the same functions for the high-pressure circulation to the tank-boiler.

There are separate water-backs to each boiler, as plainly indicated in the illustration, the circulation-pipes being as shown. The pipe p , with its valves, shows the "draw-off" connections of both boilers.

All the pipes shown, except the waste-pipes and air-pipes of the sinks, are seamless-brass pipes, tinned, and the fittings are mostly special and of brass, the couplings being extra heavy with long threads, and all nickel-plated.

Figure 8 is a detail at C, Fig. 7, but the principle applies equally to all the branches of the mains in the house.

In this case f corresponds to the header f (Fig. 7), but may apply also to the header l , the only difference being there is no one-eighth bend used with the pipes l^1 , while the diagram is an exact reproduction of the pipes f^3 . The stops C are gate-valves, and to secure a stop and waste the tee with the cock o is introduced on the fixture side of the stop. The pipe i is a collection-pipe connected with all the cocks and connected with the kitchen-sink, as may be seen at i , Fig. 7.

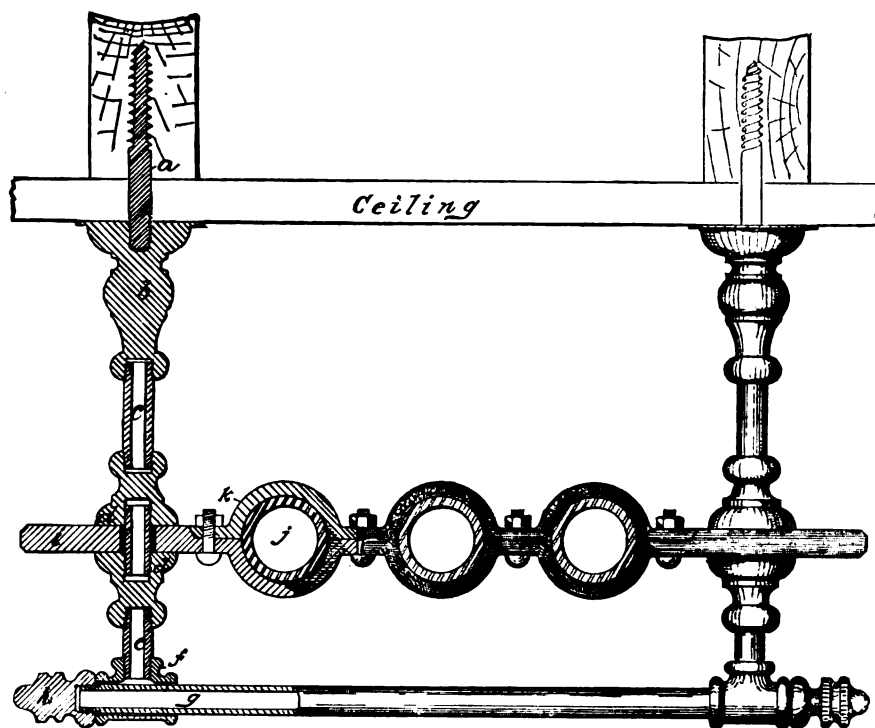


FIGURE 9.—PIPE HANGERS.

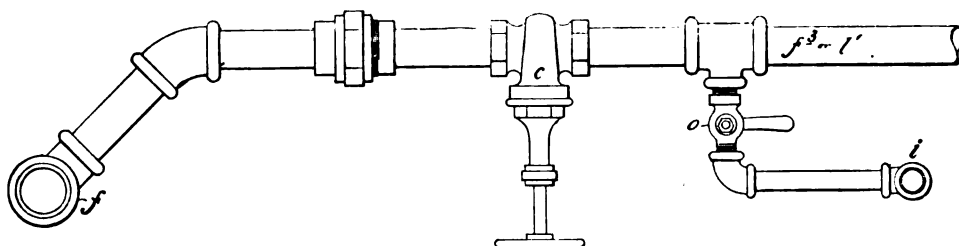


FIGURE 8.—DETAIL OF STOP AND WASTE.

Figure 9 is a detail of the pipe-hangers, D, Fig. 8, and is the same as that used throughout the basement where more than two pipes come together. It was designed with the view to making it adjustable as to height. The component parts, which are special, are the half-inch lag screw, six inches long, and the brass castings, b , d , and h , the other parts, except the bar, i , which holds the pipes, being fittings or pipe. The adjustment is secured by the length of the nipple, C , which is three-eighths of an inch (nominal) in diameter. The pipes and fittings are polished and nickel-plated, and in other respects the hanger is as shown.

The sinks used are of white porcelain, supported in cast-brass frames, with turned legs. The slabs back of the sinks are of reddish-gray marble, against which the pipes are fastened. The arrangement of the traps and air-pipes are shown, and are all plainly, though tastefully, "soiled."

Under the hood over the range is a large register opening into a flue parallel with the range chimney-flue, which latter warms it. This flue is 12"x16" in its cross-section. The hood is lined inside and out with very light-tinted tiles, as are all the walls of the kitchen. The

frame and rail under the lower edge of the hood are brass, and the arrangement for connecting the range with its chimney-flues is such as to show no pipe.

The kitchen floor is of encaustic tiles of selected designs, the colors being neutral.

(TO BE CONTINUED.)

SYSTEMS OF WATER-SUPPLY.

IN commenting on our remarks (on page 105, July 3) on the conclusions reached by Mr. Billings as to the relative economy of supplying water to towns by pumping into a reservoir or directly into the mains, *Engineering News* appears to misapprehend our position. We did not object to the statement that "the direct-pumping system is sometimes, at least, cheaper than the reservoir plan," and we agree entirely with the position taken by our contemporary opposing the advocacy of any one special "system" for all cases.

But the *News* goes on to say:

"It takes time to educate a community up to the full value of a water-supply and its proper use; and as the direct-pumpage system is of very recent origin as compared to the reservoir plan, its use is confined to the comparatively new works. This will explain why we find only half as many service-taps in the thirteen direct-pumpage towns as there are in the fifteen reservoir towns."

general principle appears to hold good that the average consumption per tap is less the greater the proportion of taps to the population, but in comparing the towns in which "the number of actual consumers per population is equal," the following results appear from the "tables" for the year 1882:

PUMP DIRECT.	Gallons per Tap.	1,230	744	558	435	1,890	1,000	599	1,069	941
	No. of Taps.	3,250	2,021	5,833	4,600	1,122	3,000	1,577	1,025	23,338
	Date of Construction.	1872	1870	1872	1854	1872	1874	1875	1868	Age, 14 yrs.
	Population, 1880.	33,592	29,720	27,412	21,420	20,603	18,360	16,856	17,315	125,388
	TOWN.	Memphis, Tenn.	Covington, Ky.	Ottawa, Ont.	Sacramento, Cal.	*Bay City, Mich.	Lake, Ill.	Bangor, Me.	Binghamton, N. Y.	
PUMP TO RESERVOIR.	Gallons per Tap.	534	568	239	240	928	547	214	716	497
	No. of Taps.	2,653	2,140	5,238	4,176	1,501	3,456	2,106	1,396	23,846
	Date of Construction.	1873	1872	1852	1867	1870	1879	1875	1866	Age, 14 yrs.
	Population, 1880.	30,151	29,630	30,010	21,782	20,207	10,030	16,995	17,166	196,871
	TOWN.	Lawrence, Mass.	Manchester, N. H.	Trenton, N. J.	Chelsea, Mass.	*Poughkeepsie, N. Y.	*Pawtucket, R. I.	Newtown, Mass.	New Brunswick, N. J.	Totals and Averages.

* From the report for 1883.

Here are eight towns of each class with very nearly the same population, age, and number of taps, but the direct-pumping supply consumes twice as much water as the reservoir-supply, so that the argument from the relative number of taps falls to the ground. In this connection we would call the attention of our critic to the fact noted by Croes & Howell in their report of 1879 on the Newark water-supply, that in Boston, Brooklyn, Chicago, and Newark, as the number of taps increased, the consumption per tap increased also, which they attributed to the increasing use of water by hotels and manufacturing establishments. The same proportional increase will be found in examining the records of other towns, we think.

The *News* very justly remarks that "under proper management and regulation of pressures, the amount per tap delivered should be practically the same with either system." This is precisely where the trouble lies in a poorly-managed direct-pressure system. The Taunton experience shows that a well-managed direct-pressure need not waste any more water than any other system, but the above figures show that the tendency is to use an excessive amount of water, and the cause of it is probably a lack of "proper management and regulation of pressures" under the ever-varying conditions of a direct-pressure pumping.

The critic adds:

"We do not see either how the question of ownership affects the choice of systems. The public administration of a water-supply is generally conceded to cost more than the private management of similar works; but this rule applies equally well to all other public works and would be felt whatever system was in use."

The question of ownership affects the choice of a system in this way: When water-works are owned by a private corporation the cost of maintenance, interest on debt, and profits to owners must be got from the purchasers of the water—that is, the consumers. The company desires to furnish the required water at the least expense. The figures given in the statement we published show that this can be done more economically by direct pumping, the total annual expense for interest and maintenance for furnishing 24,000,000 gallons daily by this method being \$599,593, and for furnishing 22,000,000 gallons daily through reservoirs being \$732,108, as deduced from the records of

We regret to be compelled to say that the valuable "statistical tables of American water-works," which furnish the data for all of our comparisons and which are published by our contemporary, do not support these allegations, the average period during which the water-works compared have been in operation being 13.7 years in the thirteen direct-pumping towns, and 12.1 years in the thirteen reservoir towns, on which the conclusions are based. There are two other reservoir towns, the works of which are a little older, but their consumption per tap is the same as the average of the other thirteen, so that the argument from age falls to the ground, and the problem of the difference in the number of taps remains unsolved.

Our friendly critic goes on to say:

"But in the towns cited the aggregate population is the same, and it is only fair to suppose that in time the average demand will be likewise equal. As the taps increase in number the average rate *per tap* will decrease, and when the number of actual consumers per population is equal, we should say from the above table that the direct system would be much the cheaper."

Here again the facts do not sustain the argument. The

wenty-nine towns. A company will charge such rates as to make its investment profitable, and the consumers have to pay them, and as a less number of consumers will use the given quantity of water, the cost to each one will be greater. That is the consumer's loss and not the company's.

On the other hand, if the public owns the works the consumer has a direct interest in the works and a voice in their management, and it is to his advantage to reduce the expense to himself. He must pay, as a consumer, the cost of operation, but he can make the interest on the original cost a charge on the public. The figures show that by having a reservoir the maintenance and operation expense is less, while the interest expense is greater. The consumer therefore will do better by the system which enables him to get his water cheaper, although the aggregate cost of furnishing the water may be greater.

As for the statement that the public administration of water-supply costs more than private management, we doubt its truth, the efficiency and completeness of the respective works being taken into consideration, and we are confident that the cost both to the consumer and taxpayer is, in the great majority of cases, less when the works are under public control.

NOTES.

At a meeting in behalf of the Metropolitan Convalescent Institution of London a few weeks since, one of the speakers who considered improper food a cause of ill health among the poor, mentioned as having come under his personal cognizance that a purveyor of food had applied at one of the docks for a contract under which he should be allowed to scrape the sewage grease from the Thames barges in order to make butter of it.

ACCORDING to one of the fire company captains in this city, the intense heat of July 2 was the cause of a curious accident. A quantity of fire-works in a shop window of Seventy-fifth Street were ignited, so he says, by the sun's rays, and exploded.

THE newly-formed Sanitary Association of Toronto, Can., begins work by adopting a resolution requesting that a special plumbing law be obtained for Toronto from the Canadian Legislature. The association desires to secure a system of registration of plumbers, filing of plans, and inspection of work, which appears to be much like that in New York and other American cities.

A CANAL-BOAT lay at dock in this city where the East Seventy-ninth Street sewer empties; the captain was in his cabin; a thunder storm arose; the sewer gushed torrents into the canal boat, and the captain swam in the East River. His boat was on the bottom, and he is thinking of damages from the city.

THE Committee of the Brooklyn Common Council on July 5 decided that nine more of the wells in that city should be closed.

GIVING verdict on the cause of death of two persons who died at Wolverhampton, Eng., recently, after eating canned salmon, the jury said it was through eating the fish which had become poisonous on account of the admission of air through a hole in the defective can.

THE AIR OF SCHOOL-ROOMS.—Dr. W. F. Sheehan, until recently Health Officer of Rochester, N. Y., some time since read a paper before the Academy of Sciences of that city on School Hygiene, in which he speaks of the close connection between the purity of air in school-rooms and clean cellars and well-constructed sanitary appliances. The purity of the air of the rooms depends in the largest measure on the purity of the cellar-air. "Cellars improperly lighted, lumbered with the refuse of years of school-work, containing bins of rags, paper, old clothes, having water-closets and urinals in darkened and unventilated corners, yield large proportions, sometimes as high as 15 per cent., of foul and disease-producing air to the rooms up-stairs, particularly in winter, when the stoves are in full blast, and when the frozen ground outside impedes the escape of poisoned air. If the water-closets are of poor pattern, if the soil-pipe is unventilated, if the drain is under the cellar-bottom, if the floor is uncoated with impervious cement or asphalt, if the ventilating-flues are open at the cellar—and these are defects commonly found in schools—the evil is aggravated. When the windows and doors of the classrooms are closed, it would not be in excess of the truth to

state that fully 50 per cent. of the air which the pupils inhale is derived from the cellar. It has become quite the fashion to place water-closets in the cellar. The style in general use is the common hopper with an S-trap under the floor level. The supply of flushing water is inadequate to drive the waste through the traps, and in them it remains to decompose and emit foul odors. In fully 25 per cent. of the closets no water is supplied to traps on account of the valves getting out of order. The odor in these apartments is abominable; it freely escapes into the halls and corridors, and subsequently into the rooms through the doors that lead to them. I know of one school where the polluted air from the water-closets is warmed by steam-pipes and sent up-stairs to be inhaled by the pupils. The smell of the water-closet is as strong in the third story as in the water-closet apartment in the cellar."

HEALTHY FOUNDATIONS.

NO. IX.

BY GLENN BROWN, ARCHITECT.

"He who builds a fair house upon an ill seat committeth himself to prison."—BACON, vol. i., page 49.

(Continued from page 31.)

BRICK FOUNDATION-WALLS.

Brick.—Brick is used, I think, more extensively than stone for the purpose of building foundation-walls, and being porous, it readily absorbs moisture through its footings or from the outside where it comes in contact with the earth. Brick are usually found in three conditions as to hardness. Arch brick, as they form the arch in the kiln, come in direct contact with fire. These brick are hard, generally slightly vitrified or glazed, but they are usually distorted. When well shaped these arch brick make the best foundations. The brick furthest from the fire are imperfectly burned and are worthless for foundations, as they absorb water and disintegrate easily. The medium brick may be used when they are well burned.

There are three classes, although they verge from one into the other, of brick earths or clays. (See Healthy Foundations, Article No. III.) (1) Earths, consisting of silica and alumina chiefly, with a small percentage of iron (hydrated oxide), lime, magnesia, manganese, etc. (2) Loams or sandy clays. (3) Marls or earths in which there is a considerable portion of lime. Where there is too much alumina, sand must be added, while loamy earth may need the addition of lime to act as a flux. The color of brick varies from the amount, degree of oxidation, or combination of the iron with other substances formed in the

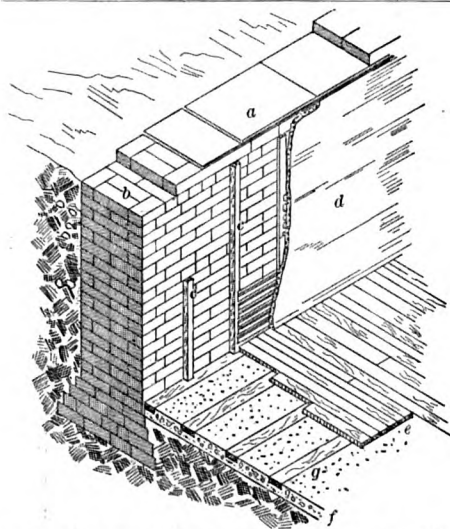


FIG. 34.—COMMON OR IMPERFECT BRICK FOUNDATION-WALL.
a, Slate damp-proof course; b, brick-wall; c, furring strip; e, flooring; f, concrete; g, floor joints.

brick, and is therefore no criterion by which we can judge the quality of all brick. It is possible, when the character and color of brick (made from clay in a known locality) is familiar to the architect, for him to judge of their quality. Usually in this country light red or "salmon brick" are inferior and unfit for foundations; dark red brick are good and may be used in foundations, while bluish or greenish brick are vitrified, and, if properly shaped, make the best foundations. Two bricks, when struck together, should have a clear ring, as a dull thud indicates either cracks or a want of proper adherence in the particles composing the bricks.

All clays should be "tempered"—that is, thoroughly mixed—and should go through a process of kneading similar to what they undergo in the pug-mill before being molded.

Where bricks are compressed by machinery, by great power, from clay in a dry or nearly dry state, they seem to disintegrate when exposed to the action of frost, and are not suitable for foundations.

The Common Brick Foundation.—The general manner of building brick foundations is very imperfect, as there must positively be no water or dampness in the ground beneath the surface, or it will show itself in the house. The excavation is made large enough, and only large enough, to receive the building, the soil in some cases being hollowed out to receive the footing, while the wall is built directly against the side of the excavation. Just above the surface of the ground a double course of slate is introduced, the slate lapping over the joints in the course beneath it. This damp-proof course only protects the wall above the ground from dampness that would rise into it by capillary attraction. The plaster is prevented from showing dampness by furring the wall. Strips one by two inches or two by three inches are nailed to the wall at intervals of twelve or sixteen inches. On these strips the lathing and plastering is done, and an air-space left between the plaster and the wall (Fig. 34). These furring strips furnish flues and fuel for the flames and are the causes of many fires.

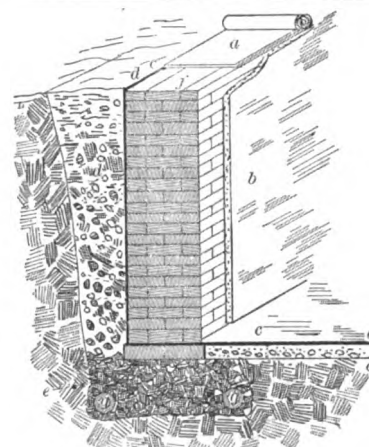


FIG. 35.—GOOD BRICK FOUNDATION.
a, Sheet-lead damp-proof course; b, plaster; c, asphalt coat; d, broken or small-stone filling; e, broken-stone footings; f, tile-drainage; h, concrete.

Common or Imperfect Brick Foundation-Wall.—Wood in contact with a damp wall will soon decay, and, at best, a thin coat of plaster is but a poor protection against damp air carrying small particles of decayed vegetable matter suspended in it.

The cellar floor is covered with a coat of concrete one inch thick; on this is placed strips of cypress or white pine two inches thick and three inches wide. The space between them is filled with a mastic composed of sand and pitch, the pitch being generally used instead of asphalt. The whole is rolled to an even surface, and the tongued and grooved flooring boards are nailed hard down against the mastic, or concrete, as it is called.

A covering of this kind is too thin to be of much value in protecting the building from moisture or ground-air.

A Good Brick Foundation.—To prevent the dampness and ground-air from entering our buildings, the footings may be made of broken stone, as described for stone-work, and the space next the wall, or between the wall and the embankment, should be filled, as mentioned before, with broken stone or small stone (Fig. 35). Where the flow of water is great, the stone-drain may be aided by running a line of small drain-tile in the stone-work, about an inch inside diameter. Authorities are divided in opinion in reference to the stability of broken stone beneath the foundation-wall. Where the natural foundation is good, I think there can be no doubt of its safety and utility. Where the natural foundation is bad or the weight of the superstructure great, then large stones or concrete must be used, as described in other parts of this article.

The wall above the footing-course and the surface of the cellar bottom is protected by a coating of asphalt, forming, as it does, a continuous coating from the surface of the ground along the face of and through the wall, and over the cellar floor.

(TO BE CONTINUED.)

WHILE some workmen were making excavations at Lincoln, Eng., on June 6, in the limits of the old Roman city, they discovered a crematory furnace and a sarcophagus, the latter containing ten cinerary urns with ashes and calcined bones.

THE INTERNATIONAL HEALTH EXHIBITION.

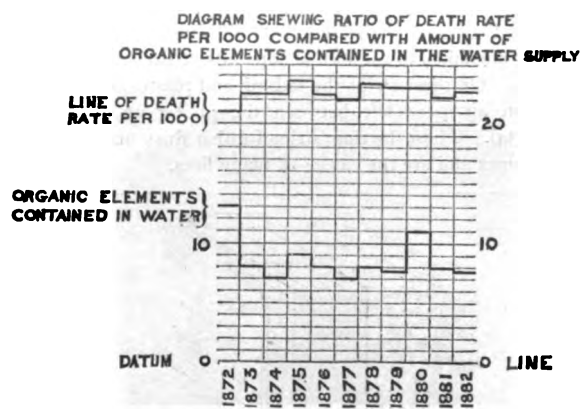
No. VIII.

(Continued from page 123.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

THE LONDON WATER COMPANIES.

In the former article on this exhibit, page 73, attention was directed to the diagrams showing the amount of organic elements contained in the water supplied by the different metropolitan companies, and the corresponding death-rate per thousand of those to whom the water was thus supplied. These diagrams are of interest, and one



has been selected as a type of all of them; it is taken from that of the Lambeth Water Company, and is as above.

The water from deep wells supplied by the Kent Company has been always taken as the standard of comparison of purity, as its table of variation is almost a straight line just above the datum line.

The next point of interest which is most graphically shown in the pavilion is that of filtration of water in bulk, and this is demonstrated by full-sized working sections of the actual filter-beds of each of the companies, these sections being arranged in glass tanks so as to show the positions and relative thickness of the various materials used in the construction of the beds.

In order that a comparison may be made between the methods adopted by the various metropolitan companies, detail sections of these filter-beds are given in the accompanying illustrations, those of the Grand Junction and West Middlesex Companies being of the most modern adaptation.

For the Kent Company's water no filtration is necessary, as it is derived from deep wells in the chalk, all the other companies obtaining their supplies from rivers; so in place of a section of a filter-bed this company shows diagrams illustrating sections of its wells sunk at Deptford and Shortlands, which are of geological interest.

The necessary periodical removal and cleansing of the upper surface of the top layer of the filter-beds causes an enormous amount of labor and expense to all the companies, which can be readily gathered from the fact that the New River Company alone cleanses nine acres of filter-bed sur-

face per month! A description of the methods adopted in order to effect this cleansing will be given when each company's exhibits are considered in detail, as illustrations are shown by some of the companies bearing upon this subject. In the next article those exhibits of each company which are of special interest will be described.

The average of the filter-beds of the different companies and the head of water maintained over them is as follows:

Name of Company.	Area of filter-beds in acres.	Head of Water maintained over the sand.
New River.....	16½	2'0", 2'6", and 9"
West Middlesex.....	12	3'0", 3'6", and 2'9"
Grand Junction.....	10¾	4'6", 3'6", and 2'9"
Chelsea.....	6¾	5'0"
Lambeth.....	7½	8'0" and 4'0"
East London.....	27	4'0"
Southwark and Vauxhall.....	15	4'0"

The velocity or rate at which the water is allowed to pass through the filtering media is an important matter, as if the water is unduly forced filtration is not really effected, and if the rate is pushed beyond a certain limit damage may be caused to the materials forming the filter-bed, or they may exchange places. The rates, therefore, at which the different companies filter their water are as follows:

New River.....	1½ imperial gals. per sq. foot of filter per hour.
West Middlesex.....	1½
Grand Junction.....	1½
Chelsea.....	1½
Lambeth.....	1½
East London.....	1½
Southwark and Vauxhall.....	1½

(TO BE CONTINUED.)

THE privy smells are so bad in Portland, Me., writes a correspondent of the *Press*, that it is impossible to sleep. As he describes it, the residents of the neighborhood in which the odors are worst have been driven to saturating the bedding with camphor, in order to conceal the vile smells. There seems to be an opportunity there for a sanitary raid.

SECRETARY FOLGER has issued a circular to United States custom officers requesting them to require of all European steamers evidence that the baggage of their passengers was not shipped

from districts of France in which cholera existed before June 20.

PLUMBING OF A BOSTON RESIDENCE.

BOSTON, June 16, 1884.

To the Editor of THE SANITARY ENGINEER:

HAVING recently completed the plumbing of a house on Commonwealth Avenue, Boston, which is arranged in a manner different from the usual practice, I send you a description.

The principal features of the work are the modes of ventilation. The plumbing, with exception of butler's sink and ice-chest, is on one side of the house, and all arranged conveniently to a brick vent-shaft in the centre of the house, inside of which the 4-inch soil and the 4-inch vent-pipe from the drain side of the traps run up. These pipes connect into a 5-inch pipe before passing through the roof. All the waste-pipes from water-closets, bowls, and bath, with their vent-pipes, connect inside of the shaft.

On the opposite side of the shaft are run up the hot and cold supply-pipes, the hot pipes being of brass, and also the branches of the cold-water pipes, to get over the necessity of fastening them to walls. All branches have union couplings on rising mains.

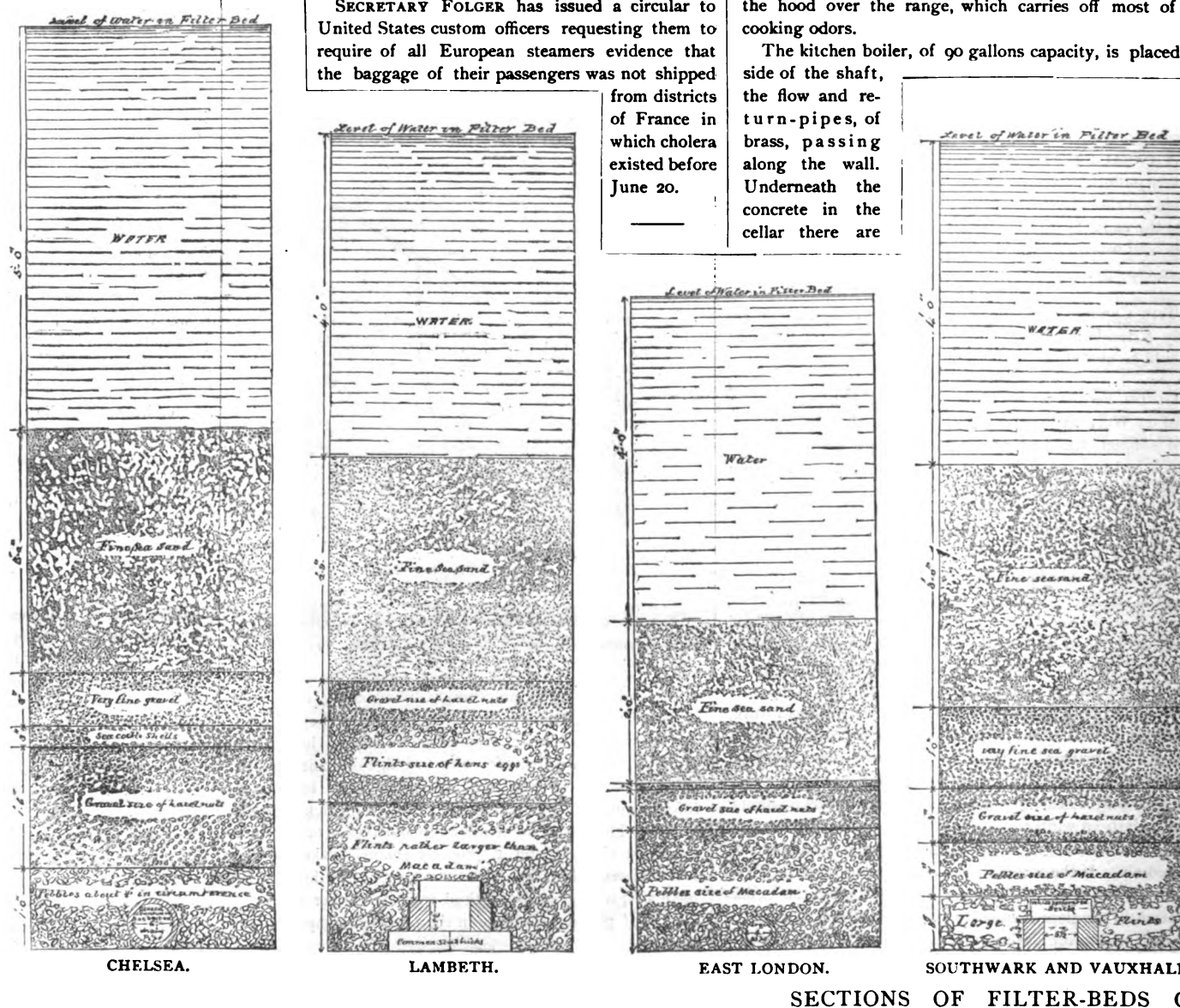
In one corner of the shaft is the kitchen smoke-pipe, which is run under the kitchen ceiling into the shaft, and carried up to the top and connected into a 12-inch brick flue. This smoke-pipe is eight inches in diameter, and is of copper.

Alongside of this smoke-pipe there is a 10-inch galvanized-iron vent-pipe, which is run through the side of the kitchen, with open registers for carrying off cooking odors.

This pipe has a 6-inch branch at the wash-room ceiling, which is immediately under the kitchen, to carry off vapors from the drying-room and odors of the wash-room. This main-pipe is carried into the 12-inch brick smoke-flue at the level of the roof, like an inverted Y, which makes sure of its drawing, and also assists the draught of the kitchen smoke-pipe. I made branches from this galvanized-iron pipe to the bowls of the water-closets, and also put a branch in each water-closet apartment for carrying off heat from gas at the ceiling; these branches draw their supply of air from underneath and around the door.

The kitchen has also an 8-inch brick-flue connected with the hood over the range, which carries off most of the cooking odors.

The kitchen boiler, of 90 gallons capacity, is placed inside of the shaft, the flow and return-pipes, of brass, passing along the wall. Underneath the concrete in the cellar there are



SECTIONS OF FILTER-BEDS OF

two main channels, formed by placing bricks half an inch apart on end, like *A*. These channels converge into a brick shaft, and are filled around with brickbats, covering the entire surface of the cellar floor. Then coarse gravel is filled in on top, and all thoroughly concreted over. This is meant as a means of escape of gases arising from defective drains, and it being all filled land in this section the soil is not good. All drains in the house are of iron. All the wash-bowls, baths, and water-closets have lead safes, the pipes of which terminate in the shaft. Also the house side of all wash-bowls and bath-traps are connected with the shaft by means of separate $1\frac{1}{4}$ -inch pipes. All these pipes, both safe and $1\frac{1}{4}$ -inch, ventilate well.

These two sets of pipes are the only ones that connect with the shaft direct, which I make use of to ventilate separately all rooms of the house, which is done by oblong pipes run along the walls under the base-boards or ceiling, furred down where required. These pipes are 10×4 ", with open register-faces, and are close to the floor. Where furnace heat is used these pipes insure a constant circulation of air in the rooms. Where open fire-places are meant to be used, a 4-inch galvanized-iron pipe should be run under the floor from the outer air, with a small register or other means to allow the escape of air in front of the fire, so as not to cool the rooms and to supply air for combustion of coal. Otherwise the smoke-flues may not draw well, owing to the ventilation-pipe carrying off the air in the room.

By this mode or arrangement the plumbing of the house is easily got at for repairs or inspection, iron rods being built in on one side, with bricks left projecting on the opposite side of the shaft, to lay plank on while working, at frequent intervals in the shaft. The roof of the shaft is glass, with windows into each water-closet, and a door at the bottom and at the second landing. These doors and windows are always kept locked, so that they cannot be opened to spoil the draught.

The amount of openings into the shaft are not equal to it in section, but all combined have half its capacity.

By observation on different occasions, when weather was heavy, snowing, or blowing from one quarter or another, there was not the slightest return-draught.

I claim that the bricks of the range and remnants of fire left in the grate at night will keep up a heat in the copper smoke-flue till morning; also, that the 90 gallons of water which will have got pretty near boiling after the dish-washing is over will remain hot till morning, thereby rarefying the air enough to insure an upward current; even should there be any blow-down it will be fresh air.

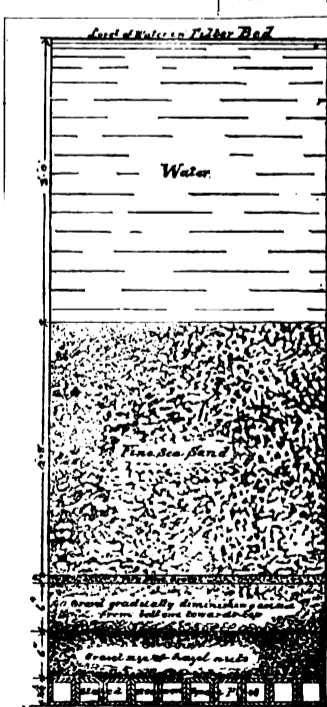
The upper end of the shaft stands above the roof three feet, and has louvres on three sides.

The drain in the rear yard, where the drain passes through to the city sewer, is arranged with a running-trap twelve feet from the wall of the house, with a clean-out on the drain side and trap-cleaning screw on the other side. The grease-cylinder I have placed on the house side of the running-trap.

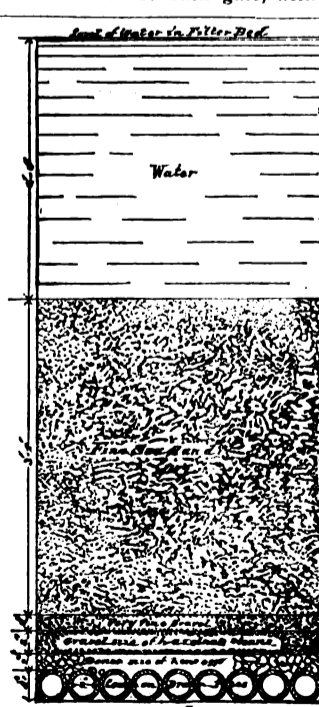
The 4-inch pipe from the kitchen and pantry wastes delivers on top of the water in the cylinder, and each of these pipes passes separately up and through the roof. The rear conductor also delivers into the grease-trap by



NEW RIVER.



WEST MIDDLESEX.



GRAND JUNCTION.

THE LONDON WATER COMPANIES.

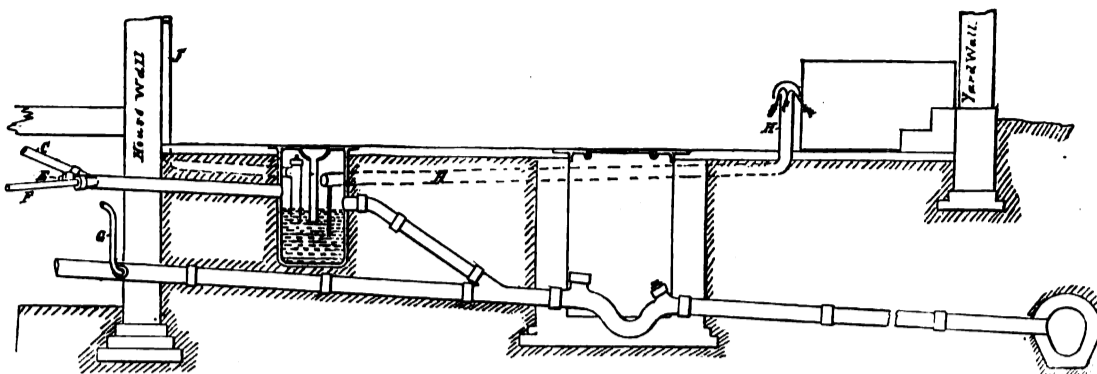


FIGURE 1.

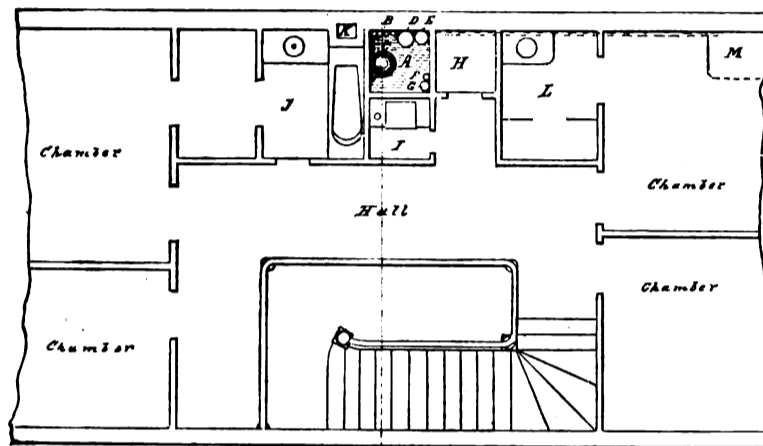
C.—Vent-pipe taken into shaft and above the roof. (Wash-trays, kitchen and pantry wastes are connected with the main waste, ventilated by C.)

E.—Clearing-screw.

G.—Ice-chest waste-pipe, with bottle-trap. (The ice-chest has a

lead tray, into which the water from melting ice drops, and the trap is ventilated. There is a $\frac{1}{4}$ -inch drip from supply-pipe to servants' closet into this trap, to keep it supplied with water.)

J.—Rain-leader trapped into the grease-trap by a long T, with lead lid.



Second Floor.

FIGURE 2.

A.—Vent-shaft.

B.—Water-supply pipes.

C.—Position of hot-water boiler in kitchen.

D.—10-inch galvanized-iron vent-pipe from kitchen, wash-room, and water-closets.

E.—8-inch smoke-pipe.

F.—4-inch vent-pipe for branches from drain side of traps.

G.—Soil-pipe.

H.—Elevator.

I.—Water-closet.

J.—Bath-room and wash-basin.

K.—Brick smoke-flue from fire-places and furnace.

L.—Rear dressing-room.

M.—Kitchen range.

means of a long T-branch, with a lead lid on top of the T to prevent odors from grease escaping at the gutter.

The cover of the grease-trap is 2'6" in diameter, having a perforated lid, with a tail-pipe, which passes down nine inches below the level of the water. This strainer is for carrying off rain-water from the yard. The lid is made with an edge and the cover with a groove, which fit into each other and can be made perfectly tight.

The fresh-air inlet I insert into the side of the grease-cylinder one foot above the water level; the other end is run underground close to the back gate, with stand-pipe

with a cap, around which the bins for holding swill and the ash-barrels are kept. The top of the outlet-T is left open so that the current of air from the swill-box, which comes through holes perforated in the sides of the box, passes over the grease-pipe and up the pantry and water-closet vent-pipes, thereby insuring the carrying of these gases clear away from the cold-air box.

These explanations may not be clear to you. I will be happy to answer any questions to make them clear. H.

[The ventilation of this house will doubtless be largely assisted and promoted by the appliances above described. The use of the well or shaft in which the drain and soil-pipes are all concentrated as an up-cast shaft is a good idea, and the heating of this column of air by the kitchen smoke-pipe and water-boiler is also a good device to promote draught. But the 10-inch galvanized-iron pipe which is set up in this shaft seems to us to be of insufficient capacity to serve at one and the same time all the duties which are imposed upon it by its branches to the kitchen, the laundry, and the water-closet seats.

The connection of the waste-pipes on the house side of the traps to the shaft by open $1\frac{1}{4}$ -inch pipes, and the connection of "all the rooms of the house" to this same shaft by open 4×10 " pipes, we do not approve of for this reason—viz.: Several of the rooms have open fire-places, which are probably intended for use. When so used there will be a tendency to draw air to supply these fire-flues through the 4×10 " vent-flues from the shaft—i. e., in a direction opposite from which the air is expected by the designer to move. If such a current is established, the rooms will receive a supply of air from the ventilation-shaft which may be more or less contaminated by the air from the waste-pipes, through the $1\frac{1}{4}$ -inch pipes connecting also with the shaft.

It is true such contamination will be no worse than what would occur if these $1\frac{1}{4}$ -inch branches from the waste-pipes were omitted altogether, as is usually the case; but such a contingency as we have supposed will be likely to render these pipes of little practical value.

The device described for ventilating every room in the house by means of one up-cast shaft has often been tried,

but never found satisfactory in the long run. Some of the branch-pipes are always found to be leading the air in a direction contrary to what was intended, under certain circumstances, so that air from one apartment is conducted into another one, where fresh air would be much better. The only way to make such a system work surely is to apply a steam fan to insure a slight overpressure throughout the building, so that air will escape by every possible opening.

The device alluded to for bringing fresh air from outside the house to supply the wants of every open fire-place, which is recommended above, we do not understand to have been actually applied. If these ducts are made of ample capacity they may prevent the air being drawn from the well or shaft to supply the open fires, but not otherwise. If these cold-air ducts are not actually applied, such a result will be likely to ensue.

We think the device for drawing air from the neighborhood of the swill-box to supply the fresh-air inlet of the main house-drain in the back yard, through a circuitous passage by way of the grease-trap, is of doubtful utility, as far as the ventilation of the swill-box goes. This odorous receptacle generally needs a more thorough and certain change of air than is likely to be had through the uncertain and intermittent up-draught through a soil-pipe in warm weather.

If the cold-air box for supplying the furnace circulation has its intake opening near the swill-box, as is intimated, we would advise some change to be made in this respect.—ED. SAN. ENG.]

SOME TENEMENT-HOUSES.

DR. LINDSLEY, Health Officer of New Haven, Conn., having visited the tenements of that city, has reported on the condition of certain ones occupied by Italians. New Haven is a city of about 65,000 inhabitants—a population of much more than average intelligence and wealth, so that it may be fairly assumed that it would make a better showing for the condition of a comparatively not large tenement class than average large towns. But the intelligence and thrift of the better classes seem to have little effect on the condition of the poorer ones, until energetic investigations have brought the community face to face with the evil state of the poor. So Dr. Lindsley reports in one tenement sinks untrapped and no connection with the sewer; cesspools and privy-vaults the substitute. All the rooms in both the buildings have doors or windows opening upon the outside of the house. The means of ventilation are therefore as good as in the average house. The chief defects of construction are in the methods of draining for the disposal of sewage and excrement, the wholly worn-out and decayed condition of much of the material of which the buildings are built, and their perfect saturation with the accumulated filth of generations. "The day I made the inspection, in company with Mr. Mix, was warm; the windows and doors were open; but the air of heaven, however freely it might enter, failed to relieve the nauseating, putrid stenches reeking on all sides from walls and floors, from stinking rags and beds and nasty crockery, and the still nastier persons of the inmates. Seemingly, the residents of these hovels appreciate the use of water as a means of making dirt stick to them and about them, and never appear to have thought of it as a means of removing dirt. If this class of Italians were allowed the unrestricted use of the city hall, or the new Welch school-house, their beastly habits would in three months convert those buildings into like unwholesome and pestiferous human pens."

Of another nest of houses, "not yet suffering so much from the infirmities of age," he says: "They are in advanced stages of premature decay, and with their present mode of use and abuse will soon be ruins. Overcrowding and uncleanness in and about the houses are the chief insanitary conditions. The privy accommodations are very unsatisfactory and altogether inadequate for the number of users. The yard about the houses is scarcely recovered from a swamp by partial filling, and by abusive uses is little better than a broad, open, drying cesspool. *The well, which is in constant use, is a surface-well, receiving in large part its supply from the drainage of this filthy area about it.*

"There is a little nearer approach to decent housekeeping in the interior of these houses than in the others, and vast gain would be made if the landlords would put them in better repair and supply satisfactory necessary accommodations, and especially if overcrowding could be prevented. In view of the possible, not to say probable, invasion of

cholera this summer from Europe, where it now prevails (and if it follows previous precedents will soon appear here), it seems that we cannot wholly ignore the danger of an impending pestilence, and calmly and supinely wait its presence before active effort is made to avert it. It is in precisely such pest-spots as those above described that it always first appears."

ON THE FILTRATION OF CERTAIN SALINE SOLUTIONS THROUGH SAND.

UNDER the above title, Professor William Ripley Nichols has an interesting article in the *Journal of the Association of Engineering Societies* for June, 1884, from which we give the following extracts:

It is well known that certain porous substances, notably bone-coal, possess the power of removing from solution organic coloring matters as well as other substances of animal or vegetable origin. This action in some cases seems to be simply an adhesion of the particles of the dissolved substances, and, by proper treatment, they may be recovered unchanged. In other cases, however, chemical change takes place, and oxygen, absorbed from the air or held in solution in the liquid, acts upon the organic matter and either destroys it or alters essentially its character. This property, which bone-coal possesses to a remarkable extent, is possessed to a much less extent by wood charcoal and by other porous substances. Moreover, the researches of Graham showed that animal charcoal possessed to a limited extent the power of removing saline substances also from their solutions. We should naturally expect that, if a substance like pure silicious sand possessed this property of absorption at all, it would be only to a very slight extent, and this is the result of experience.

It has been shown by a great number of experiments and analyses made by the Rivers Pollution Commission in England, by Piefke in Berlin, and by other observers, that the action of a common sand-filter upon the organic matter dissolved in ordinary surface waters, although appreciable, is still very slight, but Piefke has shown that, in the passage of such surface-water for a considerable distance through a porous stratum of sand and gravel, the organic matter is gradually destroyed, owing to the action of the dissolved oxygen.

What, now, is the effect of filtration through sand on the dissolved saline substances which may be in the water?

It is a somewhat widely-spread popular idea that if solutions of salt or other saline substances be filtered through a sufficient quantity of ordinary sand, the saline substances are retained to a certain extent by the sand, so that the filtered liquid contains appreciably less than before filtration. This idea has been combatted many times, but it reappears every now and then. The purpose of the present paper is to show that, for all practical purposes, the action of a sand-filter on dissolved saline substances amounts to nothing, unless it may be in the case of some substances which are susceptible of chemical change under these conditions. Thus, it may happen, under certain circumstances, that a water containing bicarbonate of lime in solution may, by simply passing through sand, give up some of its carbonic acid and deposit crystals of carbonate of lime in the pores of the filter, but the action is inappreciable with the ordinary saline substances, as a type and example of which we will take common salt.

The results of analyses made by the Rivers Pollution Commission of Great Britain showed that almost invariably the amount of the combined chlorine (or chlorides) was the same in the filtered and unfiltered water. Analyses of the Spree water at Berlin showed the same thing, and the nearly unanimous testimony of those who have examined the question is that in "the practical operation of a sand-filter, any chlorides contained in the water pass through the filter unchanged, and this is true also of most soluble salts." "It is also generally agreed among agricultural chemists that the chlorides are not retained in the soil, but pass into the drainage waters."

Professor Nichols, repeating an experiment made by others, passed a solution of common salt of about the same strength as sea-water through lengths of glass tubing two centimeters ($\frac{7}{8}$ inches) in diameter so connected as to form a J, one leg being 16 feet, the other 6 feet, in length. The tubing was filled with fine white Berkshire sand, packed very tightly. The sand had been carefully washed and then thoroughly dried. The liquid was introduced at the top of the long leg and drawn out at the extremity of the short leg, passing on its way through 22 feet of sand, and requiring three hours' time in so doing. The first portion

of the liquid which passed was found to contain exactly the same proportion of salt as the original liquid. Normandy, who described the original experiment which Prof. Nichols followed, stated that the first water will be found to be pretty fresh and drinkable, but soon becomes brackish. Prof. Nichols explains this difference in results on the supposition that in the earlier experiment the sand was *not perfectly dry*, and in that case the first portion of liquid which issued from the filter would be more dilute than what followed. To test this opinion Prof. Nichols packed a quantity of sand *slightly moist* in a 3-inch glass cylinder, making a column of sand one foot in height. A solution of chloride of sodium was passed through this filter, and successive portions collected and analyzed, giving the following results:

	Gram. salt per cu. cent.
Original solution contained.....	0.02915
1st 10 c. c. filtered.....	0.01855
2d " " ".....	0.02153
3d " " ".....	0.02374
4th " " ".....	0.02477
5th " " ".....	0.02563

The existence of wells of fresh water near the seashore Prof. Nichols explains by the fact that these wells are due to underground streams of fresh water. "The freshness of the water is not due to the removal of saline matter from infiltrating salt water, and the rise and fall of the level of such wells with the tide is due to the indirect influence of the tide in offering more or less resistance to the outflow of the ground-water."

The assertion was made at the Dublin meeting of the British Association in 1878, by Mr. Isaac Roberts, that sandstone might interpose a barrier for a time between the sea-water and wells by its filtering power. He stated that certain wells in Liverpool were becoming more brackish, and he accounted for this by supposing that water from the tidal River Mersey was drawn into the sandstone, which for a time retained a quantity of the saline matter, but the capacity of the stone was limited and was becoming exhausted. Mr. Roberts presented in support of this opinion the results of some experiments on filtering Mersey water through cubical blocks of sandstone of one square foot in section. The first filtrate showed that 80.8 per cent. of the chlorides had been removed. The percentage removed then decreased to 8.51 per cent. in the fourteenth filtrate.

As Prof. Nichols was of opinion that the decrease in chlorides in these experiments was due to the fact that Mr. Roberts' blocks of sandstone were not perfectly dry, he repeated them, using Ohio sandstone. The blocks were 6"x6" and 13 inches high, with a depression one inch deep in the top to receive the saline solution. Two blocks were experimented with, one thoroughly dried, the other wet. The result of filtering a solution of salt through them was as follows:

No. I.—WET SANDSTONE.

	Weight in grams of portion collected.	Weight of salt in grams in each cubic centimeter.
Original Solution.....	.....	0.03053
1st Portion Filtered.....	11.72	0.00988
2d " " ".....	12.47	0.01971
3d " " ".....	19.63	0.02577
4th " " ".....	120.	0.02873

No. II.—DRY SANDSTONE.

	Weight in grams of portion collected.	Weight of salt in grams in each cubic centimeter.
Original Solution.....	.....	0.03022
1st portion filtered.....	5.07	0.03643
2d " " ".....	11.26	0.03127
3d " " ".....	15.55	0.03055*

* This result is a trifle below the truth, as a drop or two of the solution was lost after weighing.

From these results Prof. Nichols concludes that if the sandstone in Mr. Roberts' experiments had been perfectly dry no effect would have been observed, unless the rock contained some salt to start with, in which case the first portion of the liquid which came through would contain a trifle more salt than the subsequent portions, as shown in the experiments with the dry block (No. II.) above. In the case of the wet sandstone the salt solution pushed before it the water already contained in the pores of the stone, mixing with it but little, so that this first portion of liquid passing through appeared to be freshened.

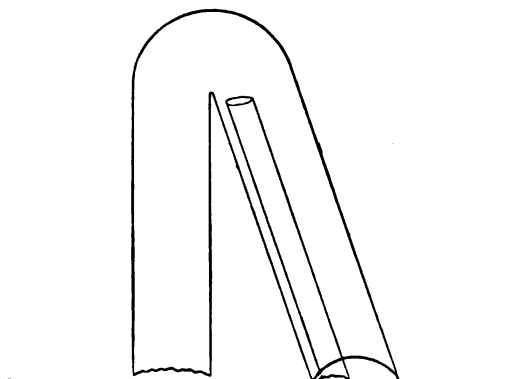
For all practical purposes it may be asserted that the action of saline solutions on sand is nothing, unless some chemical action can take place under the given circumstances.

Correspondence.

ECCENTRIC BEHAVIOR OF A FLUSHING-CISTERN.

To the Editor of THE SANITARY ENGINEER :

MY attention was called the other day to a syphon-cistern, which would at certain intervals work of itself—in fact a perfect automaton. I examined the valve and syphon, and all appeared in good order and well made. I was at a loss to account for its eccentric behavior, but on more minute examination I discovered that a piece of India-rubber tubing which had been fixed on the nozzle of the ball-valve to deaden the noise of the incoming water had drawn up



the leg of the syphon. This India-rubber being of a light nature and having a square end to it, had, when the cistern was emptied, settled on the bottom of the cistern, or at least below the point of contact of the air in the syphon, thus retaining the water in itself. When the cistern was about three-quarters filled its buoyancy was sufficient to lift it off the bottom of the cistern and thus act as a feeder for the syphon.

Yours, etc., W. SAWYER.

SYPHONING WATER THROUGH BATH-WASTES

LONDON, June 5, 1884.

To the Editor of THE SANITARY ENGINEER :

SIR : I notice on page 479, of your number for April 24, a letter describing circumstances under which bath-water was sucked into the service-pipe, in consequence of a large draw-off tap at a lower level being open. In a note you state that such an occurrence must be "uncommonly rare." In this respect I must beg to differ from you, and, in proof of my belief, I will state my own experience, which goes to prove that water may be so sucked into the service-pipe, and delivered (mixed with water from the cistern) at taps below, the only requirements necessary to fulfill these conditions being that the tap or taps at the lowest level shall be open and capable of discharging (cognizance being taken of the difference in head) slightly more than the orifice of the service-pipe at its junction with the supply-tank.

I have a cistern at the top of my house which holds about 500 gallons; this is on the third floor. On the second floor is a bath-room, closet and draw-taps. On the first floor is a lavatory and closet, on the ground floor is a closet, and in the scullery a $\frac{3}{4}$ -inch screw-down draw-off cock. About five weeks since, wishing to clean out my lead cistern, I commenced by running off the water, for this purpose opening the scullery and lavatory draw-off cocks, and fixing the pedal of the basement closet open. Water was plentifully discharged from all of these. I then proceeded to open the draw-off taps in the bath-room on the second floor, about ten feet lower than the water-level in the tank (the tap from which the water was running being about thirty-six feet below the water-level). To my surprise, instead of water coming out, air was sucked in, with much gurgling sound. On going up to the tank overhead, I found there was still two feet deep of water in it, while air and water were being discharged below with considerable noise.

I may mention that the service-pipe is a small one, one inch in diameter, and this is slightly—very slightly—throttled at the place where it is soldered into the bottom of the tank.

From the above description it is evident that all that is necessary for the suction of bath-water or other even more objectionable liquid into the service-pipe, is that the supply

to bath, or sink, or, for that matter, closet, should discharge below the level of the water in such bath, sink, or closet, and such conditions, unfortunately, are not difficult to fulfill. A bath may be left full of dirty water at a time when the cistern above is nearly empty, the supply-cock may be open, the taps in the basement may be opened, and in that case the whole of the bath-water might be syphoned out through the supply-cock, as soon as water comes on from the main to start the syphon. Sinks and closets may become choked with tea-leaves or thick paper, and other material which should not be thrown in.

The lesson to be learned from this is that the regulations of the Metropolis Water Act, 1871, framed partly to prevent waste of water and partly for purposes of promoting public health, should be attended to. I quote Regulation 26 :

"In every bath hereafter fitted or fixed the outlet shall be distinct from and unconnected with the inlet or inlets ; and the inlet or inlets must be placed so that the orifice or orifices shall be above the highest water-level of the bath. The outlet of every such bath shall be provided with a perfectly water-tight plug-valve or cock."

With regard to the dangers which may arise in town water-supply from the suction of deleterious water into the mains, I quote a letter written by me to the Society of Arts, in June, 1880. The same species of danger, though of course on a lesser scale, may exist from faulty house-services, though, of course, when the supply is from the house cistern the evil does not extend beyond the house so fitted. Yours faithfully, STEPHEN H. TERRY,

Asso. Mem., Inst. C. E.

Local Gov. Board, Whitehall, May 13, 1884.

LETTER REFERRED TO ABOVE.

To the Secretary of the Society of Arts :

With reference to the danger of supplying closets direct from the main, I will quote the outbreak of typhoid fever at Lewes, in Sussex, in the year 1874. Nearly 5,000 persons were taken ill, and of this number thirty-seven died.

It is worthy of note that only twelve closets in the town were so fitted, and that, consequently, the danger is great if so much as one closet in the town is so fitted—i. e., with a "stool-cock," and with a supply direct from the mains. This point cannot be too strongly impressed on local sanitary authorities.

In this case the soil in the pan was sucked into the mains through the stool-cock, and water thus fatally impregnated was supplied to the town. For further particulars of this case I refer to a report made by Dr. Thorne Thorne to the Local Government Board, in December, 1874.

I will quote two other instances of fever outbreak from the same cause. See report by Dr. Blaxall, "On the outbreak of enteric fever in the town of Sherbourne, in Dorset, in 1873," and the report by Dr. Buchanan, "On an outbreak of enteric fever in Caius College, Cambridge, in the autumn of 1873;" this is a very instructive report. The above two reports, with diagrams, will be found in pages 57 to 78 of the Blue-book, entitled, "Reports of the Medical Officers of the Privy Council and the Local Government Board," Series No. II., 1874, and that on the Lewes, in the issue for 1875.

The above reports clearly show that, in all these instances, the outbreak was distinctly due to the closet-system of water-supply. It is therefore clear that they would have been avoided had service-boxes or cisterns been in use.

I wish to add a few words on the subject of baths and their fittings.

First, the filthy arrangement by which the bath, closet, slop-sink, and draw-off cocks are all huddled into one small room; this arrangement appears to be greatly in favor with "jerry builders." The use of any one of these appliances precludes for the time the use of the remaining three. A bath should be in a room by itself, or, if a closet is fitted in the room, such closet should be supernumerary to those in general use. Draw-off cocks in a slop-sink form a nasty arrangement as usually fitted, for they are frequently placed below the top of the sink, which often becomes full from being choked, and the drinking-water taps may be and are often bathed in urine and other nastiness, the cans, even when the sink is clear of water, cannot be properly filled, as the taps are generally too low, and it is filthy that cans and jugs which are afterward put on the carpet should be made wet with urine and soap-suds, etc. A slop-sink should be altogether separate from the draw-off cocks.

In many modern houses a dirty arrangement of bath service-pipes exists, which, the invention of some injudicious plumber, no doubt gave him great satisfaction, more, probably, than it has ever done to the public since. I allude to the arrangement by which one opening (through a rose) in the bottom of a bath is made to do duty for inlet to hot and cold water, and for waste. By this disgusting arrangement the soap-suds and foul water which have gone from the bath are again and again "resurrected," and a bath so constructed cannot be kept fit for use, except by the most extravagant waste of water; the waste-pipe is generally laid horizontally for some distance after leaving the bath, and here the soap-suds and dirty water lodge, to be brought to light the moment that water is turned on. In most cases

such water-pipe discharges direct into the soil-pipe of the neighboring closet, which is of the pan and receiver class, and it is only necessary for that ingenious and wretched piece of mechanism to be out of order to permit a solution of closet soil to enter the bath when the water is turned on, and when the waste is left open, as it generally is, it serves as a soil-pipe ventilator into the bath-room. Bath outlet-pipes should not be less than two inches, and should lead from the lower end of the bath and discharge over a grating, and not direct into a soil-pipe or sewer; the inlet-pipes should be at the upper end; when so constructed, the bath is self-cleansing, and no time is wasted.

(Signed) STEPHEN H. TERRY,
Assoc. Mem., Inst. C. E.

Local Government Board, Whitehall, S.W., June 16, 1880.

[We are glad to record this further instance of the risks incurred in a supply to a bath entering below the water line, especially as our attention has been called to another case, in which, as in the one cited above and in those which we have before cited, the mishap seems to have been due to insufficient size of main supply-pipe to the various fixtures. The risks of direct supply to a valve on a water-closet without the intervention of a cistern are also above forcibly illustrated.]

POLLUTION OF WELL-WATER.

HAVERFORD COLLEGE, July 7, 1884.

To the Editor of THE SANITARY ENGINEER :

I HAVE a supply-well on my place, built in 1881, dug to a depth of fifty-eight feet, passing through very hard rock, securing excellent water. It was lined with a good hard-stone dry wall until coming within four feet of the top; then I used Portland cement and good lime and sand one-third cement. Built over the well is a pump-house, covered with good red-cedar shingles, and sides of shingle and tongued and grooved boards, inclosing an Ericsson pump. During last October I noticed that after very heavy rains the well-water became discolored, and the tank in house and stable received a precipitate of mud corresponding with the soil a foot below the surface of the ground surrounding the pump-house. A repetition of this has occurred during the month of June and on Saturday last. Can it be possible that the surface-water drains into the well, or is it from natural causes arising from disturbances in the spring at bottom of well after such severe rainfalls? Should the former be the case, may I respectfully ask the course to pursue to prevent a return of it? The water is at all times—saving under the above conditions—magnificent in supply and quality; in fact, famous in the neighborhood. Again, is it necessary to give the well ventilation? In its present condition it is entirely void of such treatment, a floor of yellow pine being the cover at top, on which rests the pump or engine. The sketch (crude) herein may assist in providing means to decipher the explanation attempted.

J. S.

[We cannot answer this letter until the following points are settled :

1. How deep is the earth on top of the rock?
2. What kind of earth is it—gravel, clay, sand, or what?
3. What kind of rock is there in the well—limestone, sandstone, trap, granite, gneiss, or what?
4. Is the rock seamy or solid?
5. What is the size of the well?
6. How far below the surface does the water usually stand in the well?

NOTES FROM CINCINNATI.

CINCINNATI, July 10.—The officials here appear to have become thoroughly awake to the necessity of giving a fuller support to the efforts of the Health Officer to improve the sanitary condition of our streets and alleys. The ravages of cholera in France have had the effect of scaring some of these officials into activity, and already the public are reaping good results. The fire department has been called on to assist, and have rendered valuable help in the way of flushing out the gutters, etc. It is the wish of every one that this good work will be allowed to go on.

The Fresh-Air Vacation Committee of the Associated Charities of this city is doing a glorious work this summer. Several short excursions have been given the poor little waifs around town, which included a pleasant steam-boat ride and picnic. This week, however, witnessed the first practical results of a plan that has long been in contemplation among those in the association who know the actual needs of the multitude of delicate, sickly, and over-worked women and children with whom they are thrown in contact daily in their works of charity. The first detachment, comprising a carload of these unfortunates, has been sent for a two weeks' sojourn among the farmers in the neighborhood of New Richmond, and others will follow as rapidly as the committee can find accommodations.

The filthy condition of the streets and the continued and persistent efforts of our daily papers in trying to awaken the authorities to the danger of the situation, appears to be bearing some fruit. July 2 a permanent organization

of the heads of the various city departments was effected. Mayor Stephens, Col. M. F. Reilly, of the Police Department, Health Officer C. W. Rowland, Messrs. Springmeyer & Doll, of the Board of Public Works, Assistant Solicitor McGary, and Major John D. Banks were in attendance. The organization was formed in view of the defective state of the present ordinances regulating the cleaning of streets and carting away of refuse, all of which should have been attended to months ago. Now, however, as the hot weather is upon us, and no time can be spared in overhauling and hunting up defects in old ordinances, new ones will have to be framed and presented to council at once, providing for such improvements and regulations as are obviously essential to the health of the city during the heated term. The organization resolved to hold weekly meetings, and the solicitor was instructed to draw up suitable ordinances to meet the present emergency. Health Officer Rowland suggested an ordinance requiring citizens to sweep the sidewalks and clean their gutters three feet from the curb daily during the months of May, June, July, August, and September, and from October to May twice a week at least. The suggestion was acted upon, and the ordinance will probably be presented to council at its next meeting.

NOTES FROM BUFFALO.

BUFFALO, July 11, 1884.—Building projects are generally at a standstill in Buffalo. The strike of the Bricklayers' and Stone Masons' Union is now in its sixth week. The men hold out for \$3.50 a day. This the contractors refuse. Work under Mr. Metzger, architect of the Broadway Arsenal addition, goes on slowly with non-union men. Reports that the union is about to break up are denied by the union. About 200 of the best stone masons in Buffalo are idle, and in receipt of support from other subordinate unions in the order.

CONSTITUTION AND BY-LAWS

OF THE
NATIONAL ASSOCIATION OF MASTER PLUMBERS
OF THE
UNITED STATES OF AMERICA.

THE following is the text of the constitution and by-laws adopted at the Baltimore convention for the National Association of Master Plumbers:

CONSTITUTION.

ARTICLE I., *Constitution*.—This association shall be known as the NATIONAL ASSOCIATION OF MASTER PLUMBERS of the United States of America.

ARTICLE II., *Objects*.—The association is organized for sanitary, commercial, and social purposes, and has for its special objects the advancement of the trade in all the latest discoveries of science appertaining to sanitary laws; to promote and combine the intelligence and influence of members for the protection of the trade against imposition, injustice, or encroachments upon our common rights and interests; encouraging inventions and improvements in sanitary appliances; fostering an interchange of thought, and eliciting and communicating for the benefit of each member the best talent and the result of the experience and ability of all; to promote amicable relations with employees on the basis of mutual interest and equitable justice to both journeyman and master-plumber; to encourage National and State legislation for the furtherance of the interests of sanitary laws; to secure for the members of the trade equitable treatment in their dealings with manufacturers and dealers in supplies; to regulate the system of apprenticeship and employment, so as to prevent as far as practicable the evils growing out of deficient training in the responsible duties of selecting, arranging, and fitting up of materials relating to the hydraulic and sanitary conditions of dwellings, public and private institutions; to create and maintain a sanitary code at as high a standard as the progress of science, chemical, philosophical, and mechanical knowledge teaches. And we agree to carry forward with tireless zeal the great work to which the above language relates.

ARTICLE III., *Officers*.—Its officers shall consist of a president, first vice-president at large, and a vice-president from each State as represented, recording secretary, treasurer, corresponding secretary, financial secretary, auditing committee of three, executive committee of five, and a sergeant-at-arms. The executive committee shall consist of president, first vice-president, recording secretary, treasurer and five delegates at large. The president shall be chairman of this executive committee.

ARTICLE IV., *National Convention*.—The national convention shall consist of representatives from local associations.

ARTICLE V., *National Association*.—The officers and the delegates elected by the local associations, when in convention, shall constitute the National Association.

ARTICLE VI., *Questions of Debate*.—Religious and political questions shall be utterly excluded from the debates and other exercises of this association.

ARTICLE VII., *Election of Officers*.—The second annual election of officers shall take place at Baltimore, Maryland, in June, 1884, and thereafter in June of each year, the term of office to begin immediately upon the election to and the acceptance of the office.

ARTICLE VIII., *Appropriation of Moneys*.—The appropriation of all moneys to be made at the annual meeting of the association for the ensuing year.

ARTICLE IX., *Quorum*.—A constitutional quorum of the association shall consist of fifty members in good standing.

ARTICLE X., *Manner of Election*.—The officers of this association shall be elected by ballot, and each officer elected must have a majority of the votes cast.

ARTICLE XI., *Government*.—The association shall be governed by the parliamentary law laid down in Cushing's Manual, when it does not conflict with the constitution and by-laws.

ARTICLE XII., *Amendments to the Constitution and By-Laws*.—All amendments to the constitution and by-laws shall be proposed in writing at the annual meeting of the association, and two-thirds majority shall be required for their adoption.

ARTICLE XIII., *Local Associations in Arrears*.—Local associations in arrears with their dues shall be dealt with by the National Association annually as in its wisdom may seem best.

ARTICLE XIV., *Local Associations*.—All local associations of the different States, when organized, will at once notify the corresponding secretary of this association, giving the names of the officers of the new organization.

ARTICLE XV., *Duties of Officers*.—The duties of the officers of this association shall be the same as in all civic societies, unless otherwise specified in the constitution or by-laws; the first vice-president at large taking the chair in the absence of the president; and should both these officers be absent the officer next in the order of mention in the constitution will call the association to order, and the members shall elect a temporary chairman.

ARTICLE XVI., *Duties of Local Associations*.—All local organizations shall be subordinate to the National Association, and shall obey this constitution and by-laws.

BY-LAWS.

Duties of Officers.

ARTICLE I., *President*.—The president shall preside at all meetings of the association and of the executive committee, sign all papers issued by the association, and be the chief executive officer. The first vice-president shall have the same duties and authority in the absence, disability, or death of the president.

ARTICLE II., *Recording Secretary*.—The recording secretary shall keep a record of the proceedings of the association, shall notify members of committee of their election or appointment, keep a roll of the members, and issue notices of all meetings of the association.

ARTICLE III., *Corresponding Secretary*.—The corresponding secretary shall conduct the correspondence of the association.

ARTICLE IV., *Financial Secretary*.—The financial secretary shall keep the accounts of the association. He shall receive all moneys paid to the association, and shall immediately turn them over to the treasurer, taking his receipt for same.

ARTICLE V., *Treasurer*.—The treasurer shall receive from the financial secretary all funds paid to the association, and by order of the executive committee, acting under the authority of the association, disburse the same when necessary; his accounts and books shall at all times be open to the inspection of the executive committee, also to the president, first vice-president at large, auditing committee and recording secretary, to each of whom he shall make quarterly reports, in writing, of the moneys received and paid out, and of the moneys on hand; and at the annual meeting of the association he shall, in writing, make a full report of the receipts and disbursements, and of the money on hand, bringing his original books and vouchers to the annual meeting; he shall give bonds for the faithful discharge of his duties in a sum and with sureties to be approved by the executive committee, president and recording secretary. The financial secretary to be subject to all the obligations of this article.

ARTICLE VI., *Executive Committee*.—The executive committee shall, subject to the instructions of the association, control and manage its business and the appropriation of funds, make all contracts and purchases for the association, but shall have no power to make the association liable for any debt or debts to an amount which shall exceed the amount of cash in the hands of the treasurer, and not otherwise appropriated, without the express authority of the association; and for the better execution of their powers they may appoint from their number or from local associations such other committees as occasion may require and to them may seem proper for carrying out the objects of the association, and shall have power to fill vacancies.

ARTICLE VII., *Auditing Committee*.—There shall be an auditing committee, consisting of three members, who shall audit all bills and accounts of the treasurer, and present their report at each annual meeting; the president shall fill vacancies in their number, and two of them shall be a quorum.

ARTICLE VIII., *State Vice-Presidents*.—The vice-presidents shall consist of one from each State and Territory represented in the National Association, and shall have full power to organize local clubs in their respective States and look after all local State affairs; each shall be elected by his State delegation or delegations at the annual meeting of this National Association; he shall have power to call a State convention, with the consent of the executive committee if, in their wisdom, they think it advisable and consistent with the principles of the Constitution and By-Laws; all local associations and State conventions to be subject to the National Constitution and By-Laws.

ARTICLE IX., *Sergeant-at-Arms*.—The sergeant-at-arms shall guard the door, see that none pass, or repass, except he be a master plumber in good standing and duly elected a delegate to the association; he shall carry all messages from the president to any of the other officers.

ARTICLE X., *Standing Committees*.—Neglect of any member of a standing committee to attend three consecutive meetings shall be deemed a resignation, unless a satisfactory explanation of such absence shall be given to the committee. Committees to have power to fill vacancies.

ARTICLE XI., *Credential Committee*.—The credential committee shall consist of five members, who shall examine the credentials of members, and report to the association at their earliest moment after receiving the list of delegates.

ARTICLE XII., *Sanitary Committee*.—The sanitary committee shall consist of one member from each State and Territorial association represented, and have charge of all sanitary matters appertaining to the trade; he shall be elected by his State delegation or delegations.

ARTICLE XIII., *License Committee*.—The license committee shall consist of five members, whose duty is to endeavor to regulate the license system for the benefit of the trade at large.

ARTICLE XIV., *Legislative Committee*.—The legislative committee shall consist of five members, and shall have charge of all legal and legislative matters.

ARTICLE XV., *Apprenticeship Committee*.—The apprenticeship committee shall consist of three members, and shall have charge of all matters relating to apprentices.

ARTICLE XVI., *Conference Committee*.—The conference committee shall consist of three members, whose duty it shall be to take charge of all matters referred to them relating to local associations.

ARTICLE XVII., *Essay Committee*.—The committee on essays shall consist of five members, whose duty it shall be to select subjects for the different local associations.

ARTICLE XVIII.—Any officer of this association may be removed from office for cause by a two-thirds vote at the annual or special meeting of the association, and an election to fill vacancy to take place at the same meeting of the association.

ARTICLE XIX.—All officers and chairmen of committees shall report in writing at the annual meeting of the association. All books, documents and reports of officers and reports of chairmen of committees shall be the property of this association.

RULES OF ORDER.

RULE 1.—The association shall assemble in June of each year, unless otherwise ordered by the association, for the transaction of its business, at such place as may have been decided upon at the previous convention.

RULE 2.—At the time appointed for the meeting the president shall take the chair and call the meeting to order; the association shall then proceed to business, from day to day, in the following order: (1) Appointment of the credential committee, their report and action thereon; (2) Roll call; (3) The reading of minutes of the previous meeting and amendment or approval of same; (4) Reports of select committees; (5) Reports of standing committees; (6) Reports of retiring officers; (7) Election of officers; (8) Election or appointment of committees; (9) Unfinished business of preceding meeting; (10) Miscellaneous resolutions, motions, etc.; (11) Reading of communications; (12) New business.

RULE 3.—A member wishing to speak shall arise from his seat and address the chair, but shall not proceed with his remarks until he shall have been recognized and named by the presiding officer.

RULE 4.—When two or more members arise at the same time the president shall name the one entitled to the floor.

RULE 5.—While a member is speaking no member shall hold any private discussion or pass between the speaker and the chair.

RULE 6.—Any member called to order by the chair shall immediately sit down, unless allowed to explain. If there be no appeal, the decision of the chair shall be conclusive; but if the member appeals, the association shall decide without debate, excepting a statement of the point by the appellant and a statement of the grounds of the ruling by the chair.

RULE 7.—No member shall leave the room while the business of the association is being transacted, without the permission of the president.

AN action has been brought against the Morecambe, England, Board of Health by a farmer, for damages alleged to have arisen from certain improvements made by the board. The improvement consisted in constructing a foot-path along the main road in front of a farm, by which, in wet weather, the flow of water from the farm was obstructed. This, it was claimed, had wet a threshing floor and damaged the plaintiff's grain. The County Petty Sessions, before which the case was brought, recommended to the board to make certain alterations which would remedy the evil complained of, giving them a month in which to execute the work, the plaintiff agreeing that if the board would make the alterations he would not press for compensation.

THE authorities of Algiers have decided to quarantine vessels arriving at Spanish ports, to offset the action of the Spanish officials in subjecting vessels arriving at Spanish ports from Algiers to quarantine.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JULY 5, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	12	17.8	1	8.3	2		3		1													
Boston	Mass.	435,000	143	17.1	49	34.2	13		27	2	17	3			2		3							2
Lowell	Mass.	71,500	16	11.6	6	37.5	1	1			2						1	2		5	1			
Worcester	Mass.	69,000	22	16.6	10	45.4			1	1	1	2					1					1		
Fall River	Mass.	67,000	21	16.3	12	57.1		3									5							
New Haven	Conn.	69,500	22	16.4	12	54.5			2		3										1			
Providence	R. I.	125,000	45	18.7	10	22.2	7		7		3	1			2		1				1			
Total		872,000	281	16.7	100	35.5	23	4	40	3	27	6			6		11		6		1	1		2
EASTERN CITIES.																								
Albany	New York	103,000	49	24.7	22	44.8	1		8	1	12	2		2		1	3		1					2
New York	New York	1,355,000	929	35.7	571	61.4	28	3	82	11	191	19	2	2	9	13	48		23		31	5		12
Brooklyn	New York	670,000	372	28.9	245	65.8	7		34	3	152	3	1	1	7	6	14		4		1	2		2
Hudson County	New Jersey	225,000	94	21.7	52	55.3	1	1	12		26	1		1		1	2				2	2		1
Newark	New Jersey	154,000	59	19.9	24	40.6		1	7		9	3	1	2	3		2		4					
Philadelphia	Pa.	940,000	394	21.8	203	51.5	11	10	41	5	68	8		8	1	8	12	6	8		1	3	2	1
Wilmington	Delaware	50,000	26	27.0	17	65.3	2	1			11				1									
Total		3,497,000	1,923	28.6	1,134	58.9	50	16	184	20	469	36	5	16	21	30	81	6	40	2	38	11	1	19
LAKE CITIES.																								
Buffalo	New York																							
Rochester	New York																							
Cleveland	Ohio	210,000	68	16.8	34	50.0	2	2	5		11	3		2			4	2			7	1		1
Detroit	Michigan	140,000	91	33.8	54	59.3		1	2	1	24	3			1	3	1	2			4	1		1
Chicago	Illinois	650,000	329	26.3	217	65.9	5	1	28	1	78	6	2	4	2	5	13	1	6		14	3		5
Milwaukee	Wisconsin																							
Total		1,000,000	488	25.4	305	62.5	7	4	35	2	113	12	2	6	2	6	20	4	8		25	5		7
RIVER CITIES.																								
Pittsburg	Pa.	210,000	112	27.7	53	47.3	8		8		30	4			2	6	1	2		5				1
Cincinnati	Ohio	275,000	144	27.2	58	40.2	3		11		39			4		3	1	2						3
Louisville	Ky.																							
Indianapolis	Ind.	94,000	37	20.5	18	48.6	1	1	6			1				1				1				
Minneapolis	Minn.	100,000	26	13.5	20	76.9					12	1				1				2	1			
Evansville	Ind.	34,000	27	41.8	17	62.9			5		8					1	1	1			1			
St. Louis	Mo.																							
Total		713,600	346	25.2	166	47.9	12	1	30		89	6		4	1	3	11	3	5		8	2		4
SOUTHERN CITIES.																								
District of Columbia	Wh	133,800	48	18.6	17	35.4	2		6		9				2	2	2							1
Richmond	Col.	69,300	49	36.8	24	48.9	2		10		10					1	1							
	Wh	41,000	25	31.7	11	44.0			1		1				3									
Charleston	Col.	32,400	27	43.4	14	51.8	1	1	5		3				3									
	Wh	25,000	7	14.5	2	28.5	1	1																
Atlanta	Col.	27,800	23	43.1	9	39.1		1	4		1						1							
	Wh																							
Augusta	Col.										2													
	Wh	20,000	5	13.0	2	40.0																		
Nashville	Col.	15,000	9	31.2	5	55.5					4						1							1
	Wh	35,100	12	17.8	2	16.6	1		1		3			1	1									
Memphis	Col.	21,300	8	19.5	4	50.0			1		2	1												
	Wh																							
New Orleans	Col.																							
	Wh	171,000	105	31.9	44	41.9	5		13		13			1	6	1	2				1	1	2	1
	Col.	63,000	74	61.1	30	40.5	2		9		5			1			4		2			1	6	2
Total White		425,900	202	24.7	78	38.6	9	1	21		28			4	9	3	4	2			1	1	2	2
Total Colored		228,800	190	43.2	86	45.2	5	2	29		25	1		4	6	1	7	1	2		1	1	6	4
Total in 28 U. S. Cities		6,737,300	3,430	26.5	1,869	54.4	106	28	339	25	751	61	7	36	39	48	134	16	61	3	74	21	9	38
Total in 28 English Cities																								
June 21.	8 Scottish Cities	8,762,354	3,133	18.7			121				55	18		38		60				148		60	116	
" 21.	16 Irish Cities	1,254,607	510	21.1			13				10	9		2		8				14		2	38	
" 21.	139 German Cities	858,660	398	24.1			5		65		5	5		1		7				68			5	
" 21.	15 Swiss Cities	455,537	157	17.8			6		25		9	4		8		1			15				1	
" 21.	15 Swiss Cities																							

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

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The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending July 5, 1884, in 28 cities of the United States, with an aggregate population of 6,737,300, there were reported 3,430 deaths, which is equivalent to an annual death-rate of 26.5 per 1,000. This is the largest number of deaths chronicled in these columns since the week ending July 28, 1883, when the number was 3,431. This increase is due to the season, and the loss has been, as usual under such circumstances, heaviest among children, 54.4 per cent., or over one-half of all the deaths, being under 5 years of age. For the North Atlantic cities the rate was 16.7; for the Eastern, 28.6; for the Lake, 25.4; for the River, 25.2; and in the Southern cities, for the whites, 24.7, and for the colored, 43.2 per 1,000.

Accidents caused 3.0 per cent., consumption 9.8, croup 0.8, diarrheal diseases 21.8, diphtheria 1.7, typhoid fever 1.0, malarial fevers 1.1, scarlet fever 1.3, pneumonia 3.8, bronchitis 1.7, measles 2.1, puerperal diseases 0.6, small-pox 0.2, and whooping-cough 1.0 per cent. of all deaths. Diarrheal diseases caused 25.7 per cent. of all deaths in the River cities, 24.3 in the Eastern cities, and 23.1 per cent. in the Lake cities. Measles still continues to prevail in the Lake cities, causing 5.1 per cent. of all deaths. Deaths from small-pox were reported in Philadelphia and New Orleans.

BOSTON, MASS.—C. E. Davis, Jr., reports 14 new cases of diphtheria, 30 of scarlet fever, and 5 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 20 new cases of diphtheria and 8 of scarlet fever.

BALTIMORE, MD.—The Health Officer in his weekly report registers 227 deaths, of whom 153, or 67.4 per cent. were under five years of age. The annual death-rate for the whole population was 28.86 per 1,000, or 25.32 for the whites and 49.40 for the colored. Diphtheria caused 2 deaths, croup 2, measles 3, whooping-cough 3, typhoid fever 3, diarrheal diseases 91, consumption 22, acute lung diseases 9, and violence 3.

MASSACHUSETTS.—During the week ending June 28, 1884, in 105 towns, with an aggregate population of 1,420,465, there were 421 deaths, being equivalent to an annual death-rate of 15.41 per 1,000. The highest rates were recorded in Salem, 28.3, and Haverhill, 27.3. The principal zymotic diseases caused 63 deaths, among which were, diphtheria and croup 14, diarrheal diseases 25, typhoid fever 5, scarlet fever 5, and whooping-cough 4. There were 69 deaths from consumption, and from lung diseases 27.

MEMPHIS, TENN.—During the week ending June 28, there were 33 deaths, of whom 14 were under 5 years of age. Of the decedents 13 were white and 20 colored. Diarrheal diseases caused 3 deaths, malarial fever 2, typhoid fever 1, pneumonia 1, consumption 4, and violence 1.

ST. LOUIS, MO.—During the month of June there were 613 deaths, the annual death-rate being 20.8 per 1,000. The number of deaths exceeded that of the previous month last year by 232, and that of the corresponding month last year by 92. Of the decedents 358

were under 5 years of age. Measles caused 5 deaths, scarlet fever 5, diphtheria 11, croup 9, whooping-cough 3, typhoid fever 9, malarial fevers 15, diarrheal diseases 122, acute lung diseases 41, consumption 82, and violence 37. On June 24 a death from sporadic cholera was reported.

NEW HAVEN, CONN.—During the month of June the deaths numbered 106, an annual death-rate of 16.6 per 1,000. Of the decedents 47 were under 5 years of age. Scarlet fever caused 4 deaths, diphtheria 2, typhoid fever 2, malarial fever 1, diarrheal diseases 14, consumption 17, and lung diseases 7.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales for the week ending June 21 was 18.7 per 1,000. The highest rate recorded was 26.6, in Liverpool. The highest annual death-rate from measles was 5.3, in Wolverhampton. Small-pox caused 59 deaths in London, 11 in Liverpool, 4 in Sheffield, and 1 each in Hull, Sunderland, and Cardiff.

LONDON.—Births, 2,615; deaths, 1,371; the latter being equivalent to an annual death-rate of 17.8 per 1,000. Of the decedents 611 were under 5 years of age. The number of small-pox patients under treatment in the hospitals was 1,406, 376 new cases having entered during the week. The fatal cases, which had been 27 the previous week, rose to 41, and in addition 18 deaths were recorded in the Metropolitan Asylums Hospitals outside registration London. Measles caused 81 deaths, scarlet fever 24, diphtheria 11, whooping-cough 68, typhoid fever 24, diarrheal diseases 22, consumption 149, diseases of the respiratory organs 227, and violence 57.

SCOTLAND.—The annual death-rate in the 8 principal towns for the week ending June 21 was 21.1 per 1,000. This rate is 4.2 below that of the corresponding week

last year and 1.6 below that of the previous week this year.

Dresden.—June 8-14: Deaths, 108; annual death-rate, 23.8. Diphtheria caused 8 deaths, whooping-cough 1, scarlet fever 2, typhoid fever 1, diarrhoea 3, consumption 20, acute lung diseases 5, and violence 2.

DENMARK—Copenhagen.—June 10-17: Deaths, 119; annual death-rate, 23.2 per 1,000. Diphtheria caused 1 death, whooping-cough 2, typhoid fever 2, diarrhoeal diseases 10, consumption 17, acute lung diseases 14, and violence 9.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

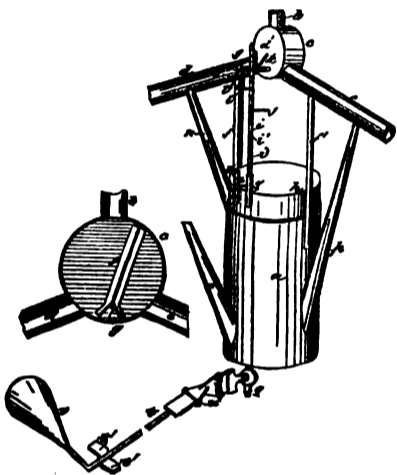
Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

295,164. HOSE ATTACHMENT FOR STREET WASHERS. CHAS. GUMBLICH, JR., Cleveland, O. Filed May 17, 1883. (No model.) Issued March 18, 1884.



Claim.—The combination of the pipe A with the neck C, provided with the flange c, the spring s, and the nut B, whereby a swivel-joint is formed, substantially as described.

295,258. AUTOMATIC RAIN-WATER REGULATOR FOR CISTERNS. FREDERICK E. LORD, St. Louis, Mo. Filed August 10, 1883. (No model.) Issued March 18, 1884.



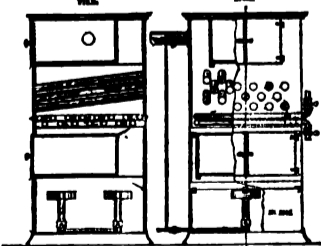
Claim.—1. The tank a, having upwardly-extending pipe n, in combination with a superposed case having water-inlet pipe b, waste-pipe d, connected with a pipe m by a wire-gauze-covered hole, and the cistern-pipe c, placed on the opposite side to pipe d, whereby as the water passes through the waste-pipe some will pass through hole m and pipe n into the tank, to raise the float, as and for the purpose described.

2. The combination, with the tank a, having upwardly-projecting pipes b, s, of the superposed case having a cistern-pipe, c, connected with pipe b, whereby the float will be maintained in a position to retain the valve tilted at its upper end on the side of pipe b opposite to that on which the cistern-pipe is situated, so that as long as the rain continues the water will be poured uninterruptedly into the cistern.

3. The combination, with the valve-pivot g and the float-stem i, of the arms j k l l', whereby the valve will be automatically operated, as described.

English Patents.

2,940. IMPROVEMENTS IN GAS-STOVES. A communication from abroad by Robert Kutscher, of Leipzig, in the Kingdom of Saxony.



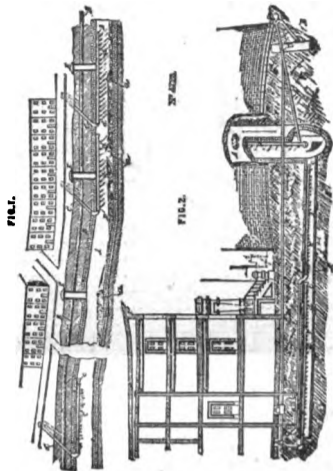
This invention has for its object the construction of gas-stoves by means of which the heat generated by the gas may be more completely utilized than has hitherto been the case.

HERBERT JOHN HADDAN, of Kensington, Middlesex. Prov. Spec. June 13, 1883. Letters patented December 11, 1883. (Price 6d.)

4,725. IMPROVED MEANS FOR FLUSHING, CLEANING, AND PURIFYING SEWERS, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention relates to novel means for flushing, cleaning, and purifying sewers, and it consists in the combination of devices hereinafter described.

Communication from abroad to WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake & Co., Patent



Agents, Southampton Buildings, London, in the county of Middlesex.
Complete spec. March 11, 1884. (Price 4d.)

Association News.

PROVIDENCE, R. I., MASTER PLUMBERS.—At the meeting of the association last week, Thomas Phillips presiding, the following business was transacted: After the reading of the minutes of the last meeting and reports of the different committees, the report of the delegates to Baltimore was heard. The Corresponding Secretary, Mr. E. F. Carey, who kept the minutes of the convention, he being a delegate, read his report, which was interesting to all present. He also spoke of the journey south, how the members of the fraternity received them at New York, Baltimore, and Washington, and of the sight-seeing while at Washington, and of the trip to Coney Island, etc., on their return, and of the courtesy and hospitality shown them by the Maryland boys. The meeting then adjourned.

PHILADELPHIA MASTER PLUMBERS.—The regular monthly meeting of the association was held Thursday evening, July 10, at the rooms of the association on Seventh Street, below Race, the President, John J. Weaver, in the chair. The minutes of the last meeting having been read and approved, the report of the Committee on Trade-Schools was presented, and Mr. Weaver also presented a report on the same subject. As this matter so very much interests the association—the schools being under the direct auspices of that body—it was agreed on motion that the discussion be postponed until a special meeting of the association, and that postal-cards should be sent to all the members, informing them of this fact, and as to the time of holding the special meeting, so as to secure as large an attendance as possible. The President then appointed committees on sanitary matters, arbitration, auditing accounts, license, apprenticeship, and conference, to serve during the coming year, after which the names of three applicants for membership were presented and referred. A number of small volumes, entitled "Extracts from Laws and Ordinances relating to the Philadelphia Water Department," having been circulated among the plumbers, some of the members thought it would be well for the association to indorse these, and give them a wider circulation throughout the city trade, and Mr. McCoach moved that the association print on the back of these volumes an indorsement of the association, and a request that the members of the association should observe fully these laws, and that they be then sent out through the city trade. Some of the members were opposed to this action of the association, claiming that such a step would be a tacit admission that they were in the habit of violating the laws, but the motion was agreed to. This action was afterward reconsidered, and Mr. Uber moved that the Chief Engineer of the Water Department be requested to provide better facilities for granting plumbers permits, and thus save them a great deal of delay they are now subjected to, which was agreed to. It is said that the facilities at the Water Department are very poor, the men sometimes being delayed a half day waiting for a permit. Mr. Gabell moved that the city be divided into five districts, and a committee of three be appointed for each district to visit the plumbers not members of the association, and request them to become members, and it was referred to the Executive Committee. A number of the delegates to the National Association made reports as to the proceedings, and

Mr. Harkness reported progress on behalf of the committee having in charge the passage of the ordinance compelling the licensing and registration of master plumbers, after which the association adjourned.

Notes.

CONSTRUCTION.

ROCHESTER, N. Y.—The total income of the water-works office for the year ending June 30 was about \$137,000. The amount paid for water-rents was \$110,221.29; unpaid water-rents, which will be placed in the tax-roll, \$18,392.07; the 3-cent tax, levied on all property in front of which water-mains have been laid but where the water has not been used during the preceding year, \$7,724.21; income derived from the sale of taps and the amount received from citizens in payment for work performed by the employees of the department, aggregating \$4,210.51.

ST. PAUL, MINN.—The following bids were received, July 1, on the Seventh Street sewer, from Jefferson Avenue to View Street, at an estimate of \$19,000: J. W. Doherty, \$24,973; Fantholt & Harrison, \$19,700; Stockton & Lindquist, \$18,549; Elmer, Newell & Morrison, \$23,600. Awarded to Stockton & Lindquist. The matter of constructing a sewer on Franklin Street, at an estimated cost of \$3,147, was sent to the council with favorable report; as also the grading of Sherman Street at a cost of \$4,400, and the grading of Oak Street at a cost of \$10,000.

FIRE-PLUGS, SPECIAL CASTINGS, ETC., WANTED.—Proposals are requested by the Board of Public Improvements of St. Louis, Henry Flad, President, until July 24, for 300 fire-plugs, 90 tons (of 2,000 pounds each) of special castings, and about 7,000 tons of cast-iron coated water-pipe.

NEW HAVEN, CONN.—Robert P. Redfield has been awarded the contract for the masonry of the new bridge of the Shore Line Railroad in James Street, and the Morse Bridge Company of Ohio the contract for the iron-work. The total cost will be about \$13,000, of which the city and the railroad each pay half.

HOUSATONIC RIVER BRIDGE.—The Edgemoor Iron Works of Philadelphia has the contract for the iron-work of the new railroad bridge over the Housatonic River, on the line of the New York, New Haven & Hartford Railroad. The total length of the bridge is 1,100 feet; length of draw, 208 feet; cost, \$200,000.

ST. PAUL, MINN.—At a meeting of the Board of Water Commissioners, July 3, after considerable debate it was voted to readvertise for wrought-iron pipes and fittings for the East Side Station.

PROVIDENCE, R. I.—City Engineer Samuel M. Gray and Mr. Charles H. Swan, C. E., whose departure for Europe to study sewerage systems and methods of disposal of sewage we some four months ago noted, have returned. During their absence they have visited Dantzic, Berlin, Breslau, Frankfurt, Amsterdam, Brussels, Paris, Milan, and Geneva, on the Continent, and London, Aylesbury, Croydon, Wimbledon, Birmingham, Coventry, Leamington, Warwick, Oxford, Wrexham, Manchester, Burnley, Bradford, Leeds, Edinburgh, Doncaster, Bedford, Leyton, and Hertford, in Great Britain. The results of their observations and study will be presented in a report to the City Council.

BUFFALO, N. Y.—The Buffalo Cement Co. (limited) has received the contract for supplying 20,000 barrels of cement to the Board of Sewer Commissioners, at 92½ cents per barrel of 300 pounds. The board has resolved to ask the Common Council for \$400,000 to complete the trunk sewer.

CINCINNATI, O.—S. Hannaford, architect, has just completed plans for H. W. Derby, Esq., for the erection of a seven-story pressed-brick business-block, to be erected on the southeast corner of Fourth and Elm Streets. The lot is 79'x140', and was purchased a short time ago by Mr. Derby at \$177,000. The building will cost upward of \$100,000. The design is very elaborate, and different from anything in this city. Bids will be received in a few days.

WATERBURY, CONN.—Bids for the Waterbury, Conn., sewers were received, July 2, as follows: Moses A. Austin, of New Britain, \$21,712; G. M. Cushing, of New York, \$19,847.20; Perkins & Galvin, Boston, \$19,521.30; Gaffney & Brenman, Waterbury, \$19,489.30; Matthew Kehoe, New Haven, \$19,406.00.

The contract was awarded to Matthew Kehoe. Work will commence about July 15.—*Engineering News.*

MARINE CITY, MICH.—MacWalker, of Port Huron, has been awarded the contract for constructing water-works for Marine City, Mich. The contract price is \$25,000.

BOSTON, MASS.—The contract for a new boiler for the County Court-House has been awarded to the Lockwood Manufacturing Company, of East Boston; for heating apparatus, to Walker & Pratt.

BUFFALO, N. Y.—Mr. Thomas Evershed, Division Engineer of the Erie Canal, with a company of engineers, has been engaged for several days past at the State Insane Asylum in taking measurements for a system of drainage which has long been needed in that institution. This work is now substantially finished, and the specifications will be prepared at once and the bids for the work asked for. The proposed improvements are expected to cost in the neighborhood of \$20,000, and will probably be made this season.

ST. LOUIS, MO.—Bridge Engineer Gaylor is preparing plans for several bridges in Forest Park.

BRASS TUBING WANTED.—The U. S. Navy Pay Office, Washington, D. C., asks for proposals until August 9 for brass tubes, to be delivered at the navy yard, Washington, D. C., as follows: Bureau of Equipment and Recruiting; 475 brass tubes, 2¼ inches outside diameter; each 10 feet long; thickness No. 11, Stubbs' wire gauge; estimated weight, 14,060 pounds.

GOVERNMENT WORK.

COURT-HOUSE AND POST-OFFICE, JACKSON, MISS.—Synopsis of bids for low-temperature hot-water heating, opened July 10: Marshbank & Sippett, amount, \$8,350; time, 3 months; Kelley & Jones, \$7,262, 60 days; S. I. Pope & Co., \$8,970, 3 months; Walworth Mfg. Co., \$7,997, 20 weeks; Bartlett, Hayward & Co., \$6,464, 10 weeks.

SYNOPSIS of bids opened July 8, 1884, by commissioners of the District of Columbia for terra-cotta pipe and branches:

6-in. junc. blocks.	\$1.50	
24"x6" branches.	\$2.20 2.00 2.25 not acct.	2.00 2.00 2.00
21"x6" branches.	\$1.55 1.25 1.50 1.75 1.50	1.25 1.25 1.25
18"x6" branches.	\$1.00 72 90 1.00	72 90 72
15"x6" branches.	65c 55 60 60	55 60 60
12"x6" branches.	50c 37½ 40 45 50	35 37½ 40 45 50
24-in. pipe per foot.	\$1.10 1.00 1.10 1.30 1.37	1.00 1.00 1.00 1.00
21-in. pipe per foot.	85c 80 85 85	80 85 85
18-in. pipe per foot.	55c 48 50 50	48 50 50
15-in. pipe per foot.	30c 32 33 35	32 33 33
12-in. pipe per foot.	25c 23 24 26	23 24 23
Bidders.	Akron Sewer-Pipe Agency. Potomac Terra-Cotta Co. McMahon, Porter & Co. Camulet Clay-Pipe Co. A. Lamond. Potomac Terra-Cotta Co. ad bid. 3d bid.	

Contracts were awarded to the Akron Sewer-Pipe Co., McMahon, Porter & Co., A. Lamond, and Potomac Terra-Cotta Co.

Contracts for furnishing trap-rock blocks for use in sewer inverts, have been awarded to the Washington Granite Company, 400,000 at \$44.00, \$47.00, and \$48.50 per 1,000; and to the Richmond Granite Company, 150,000 at \$43.75 and \$44.25 per 1,000.

THE village of Lakeside, Mich., is to provide itself with water-works.

FLINT, MICH.—The Council Committee on Street-Lighting has reported in favor of adopting the tower system.

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AMERICAN AND ENGLISH CITY RAPID TRANSIT.

We love to boast of American enterprise, and point with pride to our railroads binding with links of steel the vast continent, our bridges spanning the Hudson, the Mississippi, and the Niagara, our aqueducts conveying pure water with lavish extravagance to supply the wants and waste of millions of people, from distant lakes and mountain streams to the cities, our huge business edifices supplied with every luxury and convenience, and our overshadowing corporations, which, having exhausted the capabilities of the real objects of their creation, are compelled to seek new fields for investment of their enormous revenues.

We like to think that the American projector can devise, the American engineer design and carry out, and the American capitalist support the grandest enterprises of the world.

But every once in a while our self-appreciation receives a terrible shock at finding that in some other land of far less magnitude, some man or body of men have quietly and unobtrusively carried out a scheme so far in advance of what our supposed progressive capitalists have dared to venture on, that we are for the time being almost stunned and entirely mortified. Thus, while we have been talking and arguing about speedy means of intercommunication in large cities, a necessity of modern times (not because large cities have not before existed, but because in these days of telegraphs and telephones, of stenographers and type-writers, the rapid interchange of thought and word begets a longing for as rapid transit of matter and of man from point to point), and have given to our own cities and to the world the American surface street railroad or tramway, the slightly more rapid cable road, and the somewhat speedier stilted steam road, our conservative British brethren have quietly studied out the question of demand and supply, of outlay and profit, and have gone on to construct a work which furnishes to their metropolis what we have longed for, but feared to undertake—speedy, safe, and convenient intramural transit. And, what is more, they have done it without interfering with public property or violating private rights.

The Metropolitan Underground Railway, which traverses the heart of the most populous city of modern times, has been undertaken by capitalists who did not conceive it to be their first duty to seize upon lands which had been purchased by the public for a specific purpose and divert them to another purpose without compensation to the owners of abutting property. They seem to have had the pluck and the foresight to realize that a judicious expenditure to enable them to own the land they occupy, and to construct an enduring work, would prove more remunerative in the long run than a more fragile construction, with the risk besides of having to pay damages for encroachment on private rights.

The last completed section of this magnificent work, from the Mansion House to the Tower, a distance of about three-quarters of a mile, has been executed within the last twenty months, and runs "beneath residences, warehouses, and roadways, and in all the difficult labors of underpinning, propping, and building, there has not been a single accident." Enormous warehouses, containing iron safes and strong boxes, have been

tunneled under without disturbing their contents, and the statue of King William, which, with its pedestal, weighs 179 tons, has been underpinned and rests on the arch of the tunnel. Large trees have been undermined and underpinned without removal or injury. The result is that there is a substantial roadway on which the heaviest teams can run at high speed, and passengers can go from point to point in London without creeping along at twelve miles an hour on a structure which sheds bolts and nuts and rivet-heads down on the heads of passers-by, and requires constant repairs, while the gas and smoke and noise offend the innocent dwellers alongside the line of travel.

We doubtless have engineers as capable to design and builders as competent to execute such works as the Metropolitan Railway as any in the world, but we seem to need capitalists bold and far-seeing enough to appreciate the fact that what New York and other large cities need are permanent roads, fitted for real rapid transit, owning their right of way, and not interfering with public property or individual rights. Whether the structures should be elevated above or depressed beneath the surface of the ground is a matter of local adaptation and convenience, but the principle of absolute independence of ownership and freedom from complications, on the one hand with structures owned by the public and maintained solely for their benefit, and on the other hand with rights and privileges acquired by private citizens, partly at public expense and guaranteed to them by the public.

The amount of city travel is proved by experience to grow in proportion to the facilities afforded for it. The construction of the elevated railroads in New York City has doubled the travel on the longitudinal routes in six years. The resources of the elevated and surface roads are now taxed to their utmost, and the necessity is pressing for more and quicker modes of transit.

It certainly seems as if a sensibly designed and honestly executed scheme ought to bring fair profits on legitimate expenses.

THE "LIABILITY" OF TRADES-UNIONS.

A CASE has just been settled in one of the law courts of Manchester, England, which is worthy of the attention of society men in all parts of the world. The plaintiff sought to recover from the Society of Engineers, Machinists, Smiths, and Pattern-Makers, of which he had been a member, a sum of money for benefits while out of work. He had, it seems, been acting as foreman over a gang of men at certain works, when the society ordered a strike. The men, generally, complied with the order, although against their own wishes; the plaintiff did not, and was expelled. After his expulsion he got out of work, and at this period sought remedy against the society. The society's defense was *not* that the plaintiff had ceased to be a member by breaking through the rules, but that *the society itself was an illegal combination, of which the plaintiff had been a member, and he could not therefore take civil action against it.* Unfortunately, as the law stands the defendants were actually safeguarded by this fact, and the judge, although he animadverted in the strongest terms upon the outrageous defense, was compelled to find for them. He mulcted them, however in costs. *Verb. sap.*

THE Board of Health of Philadelphia puts it to the Board of Education very mildly when it says that the defects in the drainage of the schools, described in our correspondence elsewhere, "have a tendency to be prejudicial to the health of the children." Privy-vaults in open connection with school-rooms through untrapped pipes of basins, and water-supply pipes connected with water-closets directly, with insufficient supply, so that water fails at the closets when used at the hydrants, are more than likely prejudicial. They are positively dangerous. To sit on a powder-keg smoking may not result in a blow-up, but it certainly needs stronger description than "likely to be prejudicial." Since the Board of Health has, for the last two months, been showing up the condition of the schools with other such results as these, the tender admonition may be due to the susceptibilities of the Board of Education, which needs to be gently started on its career of reform.

WE have had the fortune several times in a few months to point out the energy with which some of the master plumbers' associations of the West have seized opportunities to put themselves in the front in advancing the sanitary work of their communities. The card, elsewhere printed, from Andrew Young of Chicago, President of the National Association of Master Plumbers, shows that the same spirit has been brought into the National Association. His suggestion that the local associations tender their services as auxiliary sanitary corps to the local boards of health, working under their direction, to assist in preventive measures against the entrance of cholera, offers a great opportunity to the local associations to do great good in their several communities and put an end to the trifling jokes at the expense of the plumber as chiefly a collector of large bills and wearer of expensive diamonds. The suggestion of Mr. Young has been heard of outside of the United States, and, we are informed, is influencing the action of the master plumbers of Montreal, who are about forming an association there.

IN Canton, China, according to *The Golden Chersonese*, by Miss Isabella Bird, every street is paved with large slabs of granite, and beneath this pavement is a drain for carrying off the rain-water. These drains open into six intercepting culverts, which empty into four branches of the river on which the city stands. The local authority of each street is bound by law to cleanse the drain of the street, and it is the duty of the prefect to cleanse the intercepting culverts every autumn. The garbage of the city is daily sent out to be used on the surrounding gardens and fields.

THE *Lancet* says a most fatal form of yellow fever has been raging at La Libertad del Salvador, Central America, for some time, from which port thousands of bags of coffee are stored and are being shipped to England and the continents of Europe and America, but principally to England, and will undoubtedly remain stored there during the hot summer weather.

WHILE a cabman was sitting on the box of his cab, on Market Street, Newark, a few evenings since, his horses suddenly disappeared. They had dropped into the sewer, which had caved in under them. While preparations were being made to get them out, the horses became frightened, and ran different ways along the connecting sewers. One was found a few hundred feet from the break, and backed to that place and hoisted out. The other had run half a mile along the sewer, and was returned to the place of the accident with considerable difficulty. It also was extricated finally without serious injury.

As much firing of cannon is usually an adjunct of presidential campaigns, Professor W. H. Brewer, President of the Board of Health of New Haven, Conn., has protested in a public letter against it in behalf of the sick.

THE Postmaster-General of the United States has brought to the attention of the Cabinet the disinfection of French mails while cholera exists in France.

OUR BRITISH CORRESPONDENCE.

Rejection of the Lower Thames Sewerage Scheme—Pollution of the Thames—Conviction for Selling Unwholesome Tinned Food—Fining a Water Company—Opening of the Sandringham Buildings—Anniversary Meeting of the Sanitary Institute.

LONDON, July 12, 1884.

THE Select Committee of the House of Commons on Wednesday last rejected the Lower Thames sewerage scheme, which, as your readers are aware, provided that the sewage of eight or nine towns on the banks of the Thames from ten to twenty miles from London should be collected at Mortlake, there to be dealt with and disposed of. The opposition to the scheme was very strong, but the chief reason for its rejection was its cost. The towns included in the scheme will now have to make their own arrangements separately for the disposal of their sewage.

The condition of the river Thames from Blackwell to Erith is causing much alarm to the riverside population and persons whose business takes them on the water. On Sunday the water was nearly black and had a most offensive and nauseating odor. It is no uncommon thing for a dead body to be left in the Thames, floating up and down, the watermen refusing to take it ashore, for the reason that the reward of five shillings, formerly paid for the recovery of drowned bodies, has been lately abolished by the county justices.

A case of selling unwholesome tinned salmon came before the West Ham Police Court on Tuesday last. The offender, a costermonger, exposed for sale sixty-eight tins of salmon, totally unfit for human consumption. The ends of the tins were bulged out, and nearly all of them contained putrid salmon. The costermonger was selling these tins at fourpence each, and was warranting them sweet and good. He was sent to prison for six weeks, with hard labor, without the option of a fine.

The East London Water-Works Company was on Tuesday fined £125 by the Queen's Bench Division, for injuries incurred by a man driving along a road, caused by the defective condition of one of the company's water-plug boxes.

On Wednesday the Prince of Wales opened an extensive block of tenements in London, for the working classes, known as Sandringham Buildings. These buildings contain 1,000 rooms, giving accommodation for twice that number of people. Each tenement is self-containing, and provided with a separate wash-house, sink, cistern, and domestic offices. They are six stories in height and each story is supplied with the newly-invented dust-shoots, which it is believed facilitates the removal of dust with absence of smell or inconvenience. Each room has its fire-place and every door throughout the building a fan-light which can be opened or shut at will. The ceilings are fire-proof and the roof flat and covered with concrete, forming a playground for children. A good deal of space is devoted to play-ground accommodation. The rooms in the new blocks will be let at from 2s. 3d. to 3s. a week each. Already over 400 applications have been received for the 140 suites ready for occupation. These were erected by the Industrial Dwellings Company, limited, of which Sir Sidney Waterlow is chairman.

The anniversary meeting of the Sanitary Institute was held on Thursday afternoon in the Theatre of the Royal Institution, when the chair was taken by Earl Fortescue, who distributed the medals and certificates awarded at the exhibition held in Glasgow last year. Dr. Bartlett delivered an address on some of the present aspects of sanitation. In the evening the members dined together at the Holborn restaurant.

SAFETY-VALVE.

It is not the foul localities that suffer alone in an epidemic. The plague spots in a town infect the whole atmosphere, and the residences most remote and in sweet and clean conditions themselves, are certain to be visited. Nor do we need to clean the town in fear of an epidemic alone. We have diseases enough already acclimated to make extra caution a duty in the summer months. All sorts of fevers and diseases of the bowels are increased in activity and virulence by a filthy condition of the city. There ought not to be a day of postponement of the work of putting our streets and premises in order for the approaching dog-days.—*Hartford Courant.*

STEAM-FITTING AND STEAM-HEATING.

BY "THERMUS."

No. XXXIX.

(Continued from page 74.)

HORIZONTAL BOILER SETTING.

THE bricks used in boiler-setting should be the best well-burned common bricks to be had in the neighborhood where the boiler is to be put up, and should be uniform in size and form.

The variations in the dimensions of bricks by the various makers and the different size of bricks peculiar to different parts of the country make it altogether impracticable for an engineer or architect to give exact thicknesses of walls in inches on his plans or in his specifications, unless he knows exactly the kind and size of bricks available. Usually each *four inches of thickness of a wall* is considered as *one brick on its flat*, let the width of the brick be what it may. But for this practice there is no rule except the one of precedent, and though the contractor may be willing to accept it when he is furnishing brick $3\frac{1}{2}$ inches wide, he sometimes objects when he finds the actual width of his bricks are $4\frac{1}{8}$ inches, and that what he is obliged to build for a 12-inch wall measures in reality 13 inches. This is a small thing apparently in itself, but as it has already led to trouble, both by the contractor trying to use three bricks on their flat and one on its edge to make a 16-inch wall, and by the fact that four such bricks will properly make a wall 17 inches wide and over, I introduce here the following table of size of bricks, which I take from "Haswell's Pocket-Book," and which must prove of service in this respect to those who have to design brick-work for boilers:

COMMON BRICK.

Baltimore.....	$8\frac{1}{4} \times 4\frac{1}{2} \times 2\frac{3}{8}$ inches.
Philadelphia.....	" " "
Wilmington.....	" " "
Croton.....	$8\frac{1}{2} \times 4 \times 2\frac{1}{4}$ "
Colabaugh.....	$8\frac{1}{4} \times 3\frac{3}{4} \times 2\frac{3}{4}$ "
Maine.....	$7\frac{1}{2} \times 3\frac{3}{4} \times 2\frac{3}{4}$ "
Milwaukee.....	$8\frac{1}{2} \times 4\frac{1}{2} \times 2\frac{3}{8}$ "
North River.....	$8 \times 3\frac{1}{2} \times 2\frac{1}{4}$ "

FIRE-BRICK.

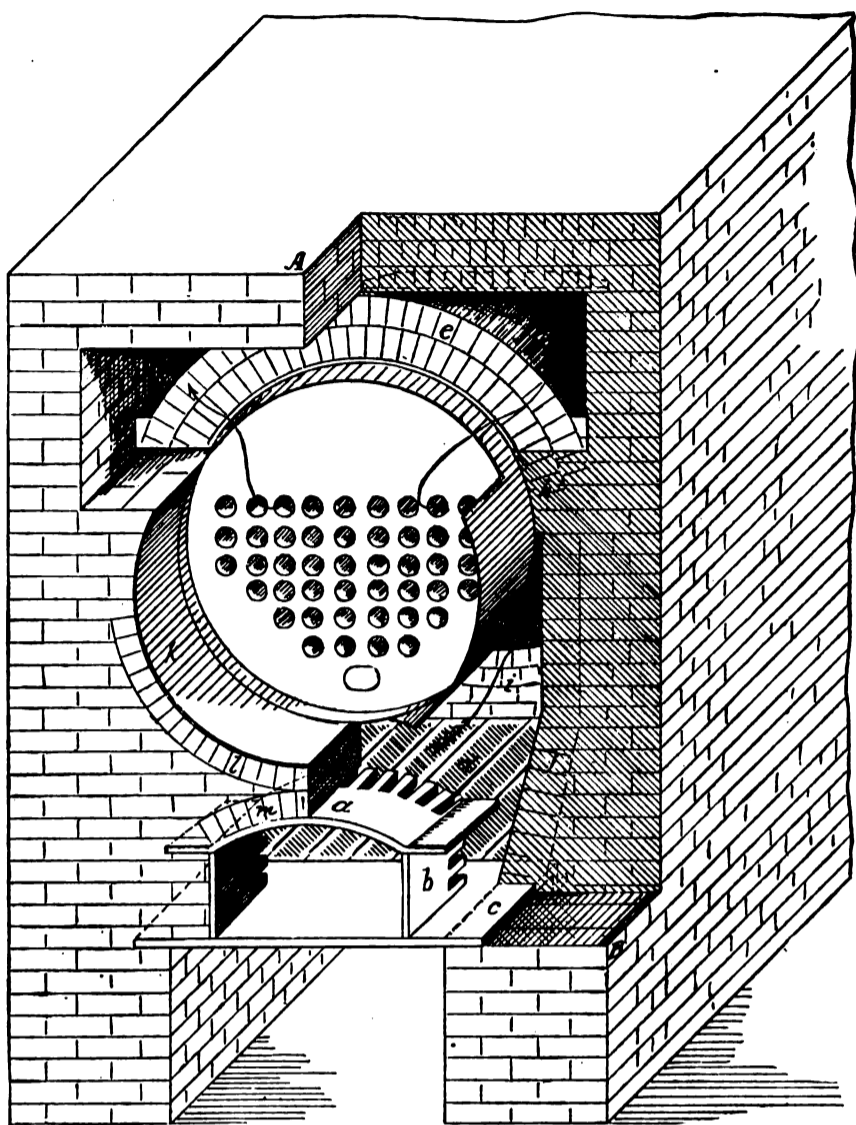
Stourbridge.....	$9\frac{1}{8} \times 4\frac{1}{2} \times 2\frac{3}{8}$ inches.
New York.....	$8\frac{1}{4} \times 4\frac{1}{2} \times 2\frac{3}{8}$ "

In laying bricks for boiler-setting the joints should be as close as it is possible to make them and still have a band of mortar between them. The average joint in a common wall for ordinary purposes should be about one-fourth, but in boiler walls, if the bricks are straight, an average of one-eighth of an inch is all that should be used. The mortar should be fine and entirely without gravel, and should be used as stiff as it is possible to use it, rubbing the outer bricks of the walls close together, and filling the interstices.

Common mortar is ordinarily composed of lime and sand, the proportion being one part lime to from three to four of sand and fine gravel. The gravel should be omitted in mortar for very close joints, and none but the best sharp sand used; the proportion of *three* parts of sand to one of lime not to be exceeded, nor should the quantity of sand be less than two to one. Sand from the seashore or "lake sand" should not be used, as the sharpness of the particles has been destroyed by attrition and the action of the water; but a further objection to ocean sand is the salt it contains, which attracts moisture. Near the fire an addition of cement to lime-mortar is of no service, but for outside walls or foundations a cement-mortar of *one* part lime, *two* parts of cement, and *three* to *three and one-half* of good, clean sand will give good results.

All parts of a boiler-setting subjected to a greater heat than 400° Fah. should be lined with fire-bricks, and flues and all permanent parts of a building which are subjected to a heat greater than 250° should be lined in like manner.

With regard to the character of fire-bricks the variations in quality are not great, but it is of the utmost importance that bricks of the desired shape be secured for the different parts of the furnace



and arches. The fire-brick lining should commence at the bottom edge of the grate and should keep the same level through the whole length of the furnace, meaning by the furnace all within the walls from the fire-door to the arch of the "back-connection." At the sides of the boiler the fire-bricks should be carried up to about the line of the lugs, and the upper courses should be alternately a "header" and a "stretcher" for about one-half the height of the fire-box, and backward from the bridge-wall for about three feet. The lining back of the bridge-wall seldom has to be removed, but that at the sides of the furnace should always be put in with the view to being renewed. For this reason there should be no heading courses in the side of the fire-box for a height of from 16 to 24 inches above the grate, varying with the different sized boilers, as the breaking of a course of fire-brick headers, which tie into the next row of stretchers, is certain to loosen them and permanently impair the stability of the walls.

A considerable "batter," or inclination of the side walls of the fire-box of this class of boilers is also of considerable advantage in adding to the permanence of the lining. Frequently a lining will get loose before it is burned out, and it is for this reason some persist in using headers. The reason, of course, for its becoming loose is because of the greater heat and expansion it is exposed to, which break any bond there is in the mortar. But when it is given an inclination outward, as shown at *j* in the sketch, gravity assists to keep it in its place, and its arch-like form, in connection with the straighter part above it, only serves to tighten it in place when heated and expanded.

Another and the most difficult part of this class of furnaces to keep in order is the arch *n*, over the fire-door, which divides the fire-box from the front connection. This division should have the thickness of two bricks on their edge, as it should have the thickness of the arch *m* as well as the inverted arch *l*. This measurement, of course

(9 inches), is considerable in small boilers, but with 42-inch diameter boilers and over there is no difficulty in obtaining sufficient height with a properly designed cast-iron front. As a general thing with ordinary fronts the distance from the grate or dead plate to the underside of the shell of the boiler is not sufficient—20 to 21 inches being the rule—which with a height of 15 inches for the fire-door leaves but 5 or 6 inches for the two arches, destroying the continuity of one or the other or forming both with clipped bricks, which is not sufficient for self-sustaining arches in a position exposed to the action of the fire and the jarring caused by the slapping of the fire-doors, as this is.

The distance between the fire-door and the front-connection door should be at least 9 inches, which with a height of 15 inches for the fire-door makes the whole distance between the dead-plate and the boiler only 24 inches—a distance which for other obvious reasons should be maintained in the smallest horizontal boilers used when they are set in the manner under discussion, which is the practice most in use. This allows for an arch, *m*, to be turned on top of the iron arch *a*, and gives room between the extension of the shell of the boiler *k* for an inverted arch, *l*. If now the iron-arch and fire-door linings *a* and *b* burn away, as they generally do, the arches *m* and *l* will remain to protect the extension *k* and the fire-front from the action of the fire until such time as the engineer has an opportunity to have new castings inserted. The flatness of the arch *m* is generally a source of trouble and annoyance with most fronts, and if bricklayers are not seen to they are apt to lay their bricks flat on the plate *a*—in fact not turn the "row-locks" *m* and *l* at all. This of course lets the division *n* fall, and at once exposes the iron at *k* to the action of the fire in the grate, and as *k* has heat at both sides of it, it will burn out in a few days.

Some, in setting boilers, do not use the castings *a* and *b*, but build up from the dead-plate, taking much pains with their arches. I have

found in practice that these arches are best reinforced with iron; that when they are not supported the fire-clay works out of them by the continued jarring, as the fire-clay does not burn and become hard like the bricks, the heat not being sufficient at this part of the furnace.

(TO BE CONTINUED.)

PLUMBERS' ASSOCIATIONS AS AUXILIARY SANITARY CORPS.

PRESIDENT of the National Association of Master Plumbers of the United States Andrew Young, of Chicago, has issued the following card to all the associations, recommending co-operation with health authorities to prevent the inroads of cholera:

CHICAGO, July 12.—To the Master Plumbers' Associations of the United States: In view of the alarm in the public mind and the dread of a visitation of cholera, and considering the inadequate means of many of our local health boards to make their work as thorough as is required in view of an epidemic, I would suggest to the Master Plumbers' Association in every city in the United States to tender their services as an auxiliary sanitary corps under the authority and direction of the local boards of health. Our business brings us daily in contact with all the phases of city life, and few have the opportunity of noting the sanitary condition of a city equal to ourselves. Blanks might be furnished by the local boards of health with the proper headings, so that the plumber may readily report any premises found in an insanitary condition. I earnestly trust that, for the honor of our National Association and the cause of sanitation to which we are pledged, our local associations may take prompt action.

ANDREW YOUNG,
President National Association.

President Young has explained the card in an interview in the *Inter-Ocean*:

"The National Association of Master Plumbers intends during the coming year to aid and assist the health departments of the various cities in the United States by all the means in its power, so as to place cities in a proper sanitary condition in view of the probable epidemic of cholera. The regular health officers only go and visit premises that are reported, while we come in contact with insanitary places daily—hourly, you might say. Take the journeymen plumbers of Chicago to-day. There are one thousand of them on different jobs in the city to-day. It would be no trouble for them to report on any abuses—say that the premises they were at are in tolerable condition, but the premises next door are in bad state and a danger to health. Our city ordinances state that where streets are sewered no privy shall be located in yards. The law is a dead letter as far as that goes, because there are thousands of privies on property facing sewered streets in the city of Chicago that are reeking with filth, and are never complained of till complaint is made by adjoining property-owners. Any demand can be made on the Chicago master plumbers, and it will be cheerfully acceded to, as every individual member as much as myself is thoroughly interested in this work, the health of the city being paramount to every other consideration. They will work individually and as a body, and that unselfishly."

TROUBLE BETWEEN PLUMBERS AND A WATER COMPANY.

THE plumbers of Indianapolis, Ind., have notified the water company that they desire to withdraw the bonds which they have given to the company for the proper execution of work in connection with the company's mains. They give as the cause of their action the constant changes which the company makes in its regulations, which prevents the plumbers from giving satisfaction to their patrons, and the arbitrary way in which the company enforces the regulations. The plumbers also claim that the company has so made its rules as to require them to do work which in other cities is done by the employees of the water companies.

THE cholera scare has created some ludicrous incidents in Europe. At the little Italian town of Vintimiglia 2,000 Italians flying panic-stricken from Toulon and Marseilles were stopped by the Italian carabinieri, who would not allow them to proceed. On the other hand the French gendarmes would not allow them to return, and the unfortunate refugees had no alternative but to camp out between the two sanitary cordons.

THE Board of Health of Asbury Park, N. J., is prepared to give information on the sanitary condition of hotels, boarding-houses, and rented cottages.

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

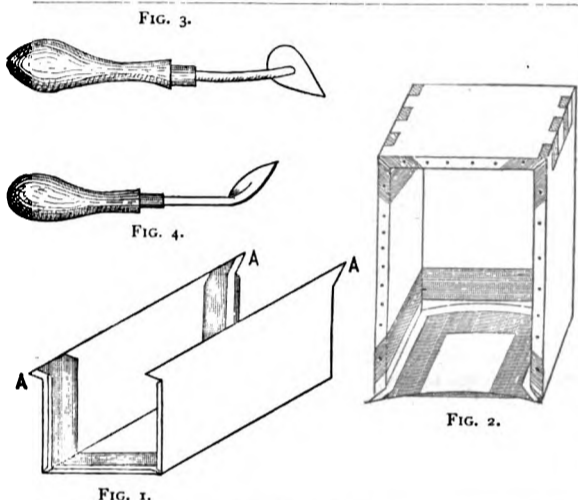
No. XXI.

(Continued from page 76.)

LINING SINKS AND CISTERNS (CONTINUED).

A NEW beginner at cistern-soldering generally wastes so much time at patting and heating his solder that he gets part of it so hot that it runs away from the angle and perhaps beyond the soiling, so that it tins on the unprotected lead, while other portions are almost set, or at all events too cold for wiping. The result is that he only wipes a short portion at a time, and while he is playing with the solder the heated portion of the lead is extending more and more, and as fast as he pushes back the bulged parts they come out again, and at last it perhaps takes him longer to keep the lead back than it does to wipe the angle. It need scarcely be added that the work when done is very dirty and has a very ragged appearance, whereas a good plumber quickly gets up his heat and wipes perhaps eighteen inches or two feet at one stroke, and so keeps on, for the quicker it is done the cleaner it looks, and the less the sides bulge inward.

In the last paper was described how to line a cistern with one piece of lead. We will now proceed to describe how to line one with the bottom



and sides in one piece and the two ends soldered in afterward.

Cut out the lead to the proper size and allow for turning over on the top edge, with the angle pieces on the corners at *AA*, Fig. 1, and the half inch for the undercloak, as in last paper; soil, shave, and drop it into the wooden case, as previously described. Put a few clout-nails through the undercloak to hold it in its place, but drive them well in so that the heads do not stand up beyond the surface of the lead, and so make bumps which will show through the next piece of lead which laps over them. Next cut out the pieces of lead for the ends, not forgetting the top angle pieces. This piece of lead should be one-eighth of an inch wider than the place it is to fit, so that it pinches tightly into its place, the centre part being bellied upward to insure this, as shown in Fig. 2. It is a good plan to slightly bevel the edges by rasping, so that if it should fit too tight they will give a little, and so avoid the necessity of *dressing* the bellied part in to get rid of the superfluous lead. When cutting out lead for these cisterns it is always best to get a wooden lath and cut it to the length, and fit in the cistern, and mark the lead from that, so as to insure it being the size required, for if it is too small the solder will run through, and if too large the dresser has to be used at the risk of spoiling the shaving and soiling, as before mentioned.

For larger-sized cisterns the lead is generally cut out so that an end and side are in one piece, and the bottom is put in by itself. According to the principles laid down in an earlier paper, the bottom should be put in first and the edges turned up all around, so that the solder cannot by any means run through, but in practice this is very rarely done, as the workmen's feet and tools laying about scratch the lead, and in addition it is not so easy to get the sides in afterward; one

reason is that lead will not slide on lead, and another is that the bottom edge of the piece forming the side and end wants stiffening by turning a small portion, for it must be remembered that the whole weight of the piece has to be supported by the bottom edge, and if this is not looked to, perhaps one end will drop a little and so throw the whole piece out of square with the cistern-case, with the result that the lead angle will not be tight home.

To line a cistern in this manner cut out the lead, leaving corner pieces on the top as before described, and an inch extra in length for each angle, and also enough for laying on the bottom and turning on the top edge. These surplus pieces for the ends and bottom should be turned up and dressed perfectly straight, by placing a piece of timber inside to insure this; the piece of lead should then be folded to fit the upright angle, and "set in" lightly, and then well dressed on the outside to a moderately sharp arris. The piece of lead should then be folded two or three times for convenience of removal, care being taken not to spoil the part which is prepared to fit the angle, and the inch margin on the bottom edge which is turned up should be doubled inward, not outward. The piece should then be carried and placed in the cistern-case and partly unfolded, so that the angle part can be placed in its proper position; next proceed to unfold the sides and to belly them the reverse way, so that the ends can be forced back into their respective angles; drive a clout-nail in temporarily—i. e., only half way in, to hold one angle until the other one is treated in the same manner; force back the bellied parts a little, and then look to see that the angle is tight home; if not, pinch the ends of the lead toward it with a chisel, and then drive in a part of the small return piece; renail temporarily the ends and force back the remainder of the bellied parts, and at the same time dress down the buckles on the bottom edge; thin the outer edge with a shave-hook, and drive in clout-nails about a foot apart, to keep it back; serve the ends in the same manner, and then use a leaden flapper to take out all bulgings or irregularities; work over the top edge and nail it. Prepare the other side and end in the same way and fix it in its position as described for the other; but in this case the return pieces on the ends should be cut off and only leave about one-eighth of an inch, which can be driven in afterward, so as not to project far enough to show through the soldering if it should happen to be wiped too bare by using a thin cloth; put a nail in temporarily near the top of each soldered angle, to keep it from rising when the top edge is being worked over, after which it should be taken out again, so that the lead can be properly shaved.

When the writer was first in his apprenticeship he was sent out with a plumber to line a cistern. The lead was got into its place and the plumber thought he deserved half a pint, as he had been working so hard; in his absence his mate (the writer) thought, as he was a long time gone, he would do what he could to forward the work; so he got some clout-nails, and after warming them in a ladle to insure them from being damp and so blow when the soldering was being done, carefully drove them in about three inches apart all around the angles. By-and-bye, when the plumber came back and saw what was done, the blow he gave was one not easily forgotten, and the language he used was almost that of a madman, and the reader would scarcely blame him, if he (the reader) ever had to shave a cistern after it was nailed. The writer now never uses nails for holding the lead back, excepting for the undercloak. After the sides have been placed in their position, the bottom piece of lead should be cut a little larger than the cistern, and the edges curled up, so that the lead will drop down into its position; or if the piece is too large to move about when open, it can be folded up, and the edges which are curled up buckled inward, and afterward unfolded in its position; the edges must be worked tight against the sides—in fact a sharp-edged dresser and chase-wedger can be

used so as to almost cut the lead through; the surplus should then be trimmed off. When all is ready and the whole of the lead *flapped* nice and smooth, measure the requisite distances at various points, and then use a chalk line to mark the space for soiling; this is generally done with a pair of pointed compasses, with the result that the lead is scratched and sometimes partly cut. When the soil is dry shave one upright angle and about a foot each way on the bottom; punch the corners at intervals instead of using nails, and touch and solder this angle before preparing any more, as the sooner the soldering is done after shaving the better.

It is a good plan to keep a shave-hook especially for cistern angles, one just the right size, so that it will take off a shaving the proper width, without the trouble of measuring and gauging or using a straight-edge. This shave-hook should not have a very sharp point, but one slightly rounded, as illustrated in a previous paper. For getting into the corners where the ordinary straight hook will not reach, some men will use a bent hook, as shown in Fig. 3, while others prefer what is called a spoon-hook, as illustrated in Fig. 4. When soldering the bottom great care should be taken not to move about more than can be helped, especially in a small-sized cistern, as great risk is run of breaking the soldered parts before they are thoroughly set. The writer has just repaired a cistern with a crack in the soldering, after three or four plumbers had failed to find the cause of leakage, which arose from neglect of this precaution. When the bottom is being wiped there is sometimes a little trouble when passing the soldering of the upright angles. Some plumbers will paste a piece of brown paper over them, while others will only smear them with chalk to prevent the bottom solder from tinning too high up; others can get away very well without doing either, by simply being careful not to splash the solder too high up the angles, and not getting too much of a body, so as to be unmanageable and beyond control.

(TO BE CONTINUED.)

DISINFECTION OF GUTTERS.

ON the 8th of July the Fourth Division ("Vaccination and Disinfection") of the Department of Health of New York City, under Dr. James B. Taylor, commenced the disinfection of certain gutters and other damp places.

Their method is to seek out all places where the sun cannot reach or where water or sewage is likely to remain stagnant, such as yard-drains, cesspools, privy-vaults, cellars, covered ways, or anything in the judgment of the inspector that is likely to harbor or foster decomposing organic matter, and treat it with a solution of sulphate of iron (copperas) in a more or less copious manner as the surroundings seem to warrant.

The parts of the city requiring this attention are divided into eight districts or patrols, to each of which an especially constructed and painted wagon is assigned. The inspector in charge of the wagon gets his preliminary information of obscure locations from certain records of the department and from the police, but he also finds in the most squalid neighborhoods some persons who appreciate and hail the advent of the "disinfecting wagon," who are ready and willing to point out nuisances, and by whose aid the department feels it is put in possession of facts that might otherwise escape observation.

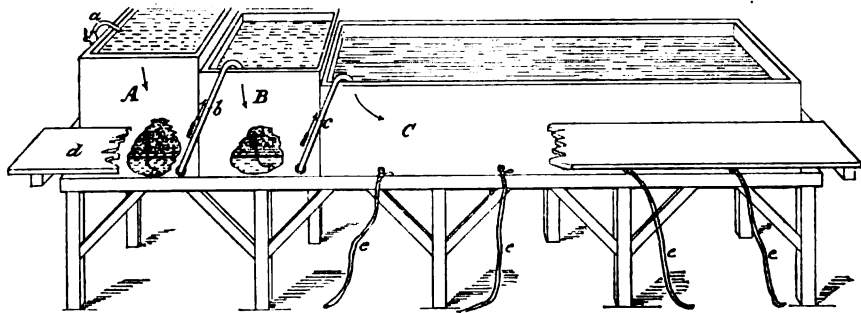
The method of applying the solution is by ordinary hand sprinkling-pots, so that side walls and almost all places may be reached and saturated without an unnecessary waste of the materials.

The wagons are four-wheeled trucks, upon which are mounted horizontal wooden cylinders, in size and shape similar to an ordinary watering-cart. At the rear end is a faucet for filling the sprinkling-pots, and each wagon is attended by five men.

The body of the trucks and the wheels are painted a dark green, and the cylinder a bright yellow, so as to distinguish them at a distance, and they are marked "Health Department" and numbered in black figures.

The quantity of the salt of sulphate of iron dissolved per day is from 20 to 30 barrels, the average being 25, or about 7,500 pounds. To melt this large quantity of salt (copperas) per diem some systematic method had to be employed. Dissolving in barrels or puncheons was expensive in labor, and

tedious, and would not give a saturated solution, and mechanical agitation on as large a scale as would be necessary seemed to require too expensive a plant. To overcome these difficulties Dr. James B. Taylor, Chief Inspector of the Fourth Division, devised the apparatus shown in the cut, which we present as being of probable interest to other health officers who may have large quantities of salts to dissolve, and which appears to give the result required with small labor and no agitation, except that produced by the current of water as it passes through the tanks.



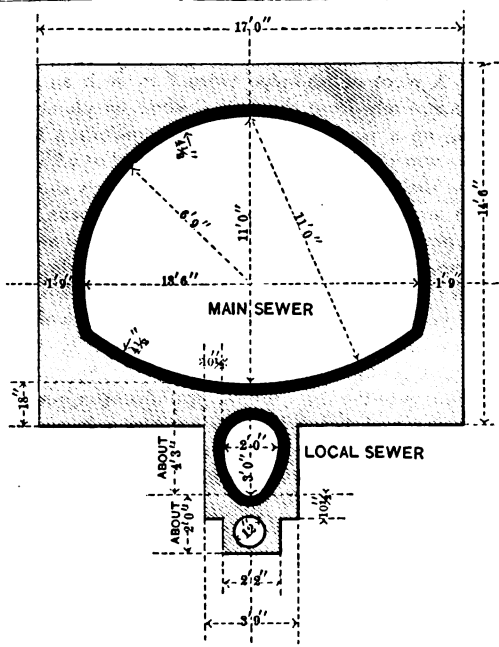
The tanks are made of yellow pine. The one on the right (A) is five feet deep by five feet square, with a false bottom one foot from the bottom. The next tank (B) is of the same construction, with the exception of being six inches less in height, and the tank C is twenty feet long by three feet deep. The salt is put into the tanks A and B on top of the false bottoms. The false bottoms are perforated with auger-holes, over which is a wire gauze to prevent the fine salt from falling through. The "Croton" water (street supply) is then passed through the pipe and faucet *a* into tank A, where its passage is downward over the salt and through the holes in the false bottom into the space underneath, thence upward through the pipe *b*, overflowing into the tank B when the water in A is above the bend of the pipe *b*. The water leaves tank A almost fully saturated with the salt, but is carried into B, through which it passes in the same manner as it does through A, overflowing into C when the water is sufficiently high in B. The test of the fluid in C, taken with a "heavy-fluid" hydrometer, shows a 25 per cent. solution, the temperature of the water being about 60° Fah.

The faucets and hose, *c, c*, are 1½ inch in diameter, and are for conveying the solution into the wagons.

One object in getting a fully saturated solution is that wagons which have to go a long distance can be filled one-half or three-fourths at the yard, and afterward run full from the nearest hydrant when the point of distribution is reached.

A LARGE LONDON SEWER.

THE largest sewer in London, England, has just been completed under the superintendence of Mr. John Grant, M. Inst. C. E. It is a storm-overflow sewer in Church



Street, Deptford, and is 3,370 feet long, of which 3,050 feet is of the dimensions shown on the figure, and is built of Portland cement concrete, lined with brick. This section contains 16,000 cubic yards of concrete and 2,650 cubic yards of brick-work. It is laid at an average depth of 23 feet below the surface, and cost \$38 per linear foot.

OVERHEAD WIRES.*

OVERHEAD wires are a permanent and absolute source of danger, because every wire of whatever kind—galvanized-iron, bronze or other—deteriorates more or less slowly under atmospheric influences, and especially in smoky and sulphur-laden air of cities. Those best qualified to speak on the subject from long experience, agree that the life of every wire is limited, and none can tell how or when a wire may snap. The internal flaws do not reveal themselves when the line is erected, nor can they be detected after the line

has been put up except by the actual breaking of the line. Professor Hughes, F.R.S., the well-known inventor of the printing telegraph and of the microphone, who has made thousands of experiments on wires, has established the fact that every vibration imparted to a wire brings it a stage nearer to a state of internal crystallization, when it snaps short, its fibrous structure having completely degenerated. When this condition is arrived at its strength is gone. Professor Hughes has even measured the number of vibrations which determine the length of life of wires of different kinds, and finds the number different for different materials, but in every case, even with the best and most perfect material, a limited number. Given at first a wire of ideal perfection, when it has swayed to and fro its allotted number of hundreds of thousands of times in the breezes, it must snap. But no such wire is attainable; all are more or less faulty, and cannot be relied on, even with the most diligent inspection, when once set up in the smoky air. It is said sometimes no accidents have ever yet happened except that one in Dalston about five years ago, when an omnibus driver was decapitated by the falling of a wire. There is, on the other hand, the statement made by no less eminent an authority than Mr. Preece, that numerous accidents have arisen from the falling of wires. Most of the existing telephone wires are, however, only five or six years old; another five years, and there will be a fine crop of accidents to report. True, the danger to life and property might to some extent be minimized if it were possible for wires always to cross streets at right angles and in short spans. This is, however, impossible—first, because the streets of a city are not usually all laid out at right angles to one another; and, secondly, because there is no law to compel owners of property on one side of a street to permit the erection of poles on the housetop at a point exactly opposite some house on the other side of the street where a pole is erected. Moreover the erection of lines in short spans at right angles to the main thoroughfares is exactly what the telephone companies have not done. They have aimed at carrying their trunk-lines as much as possible along the main highways of commerce, and in long spans, so as to have the expense of fewer poles and fewer way-leaves. Even now the price expected by householders and occupiers in London and other cities is rising to a high price. Owners of property are finding that with the risks that are run in permitting the fixing of standards, and the necessary difficulty of finding suitable points to which to attach wires a rental of £10 per annum is not too much to ask from a telephone company for the right of passing over the roof. All this can have but one ending: it will tend to make the poles few and the spans long and dangerous.

Common sense, therefore, suggests as the obvious remedy that already adopted in other great cities, such as Paris and Berlin—namely, the laying of the wires underground in proper channels under the road or kerbway, exactly as is done already for telegraph wires in London and in many cities. In 1881 the telephone wires in Paris ran overhead; they are now all buried underground. In Newcastle-on-Tyne the whole of the telephone wires in the city run underground. In Birmingham a large proportion are likewise underground, and, though it is not generally known by the public, it is a fact that in the metropolis the telephone wires run by the post-office authorities to connect the various Government offices with one another are carried

* Professor Silvanus P. Thompson, in the *Pall Mall Gazette*.

underground. The post-office, indeed, though for its own purpose it runs its telephone wires underground, still runs them overhead in the majority of cases where it is only the long-suffering public who are to use them. The constant annoyance of having lines interrupted by repairs, or fracture, and of having telephonic conversation interrupted by the overhead wire of one subscriber coming into contact with that of another subscriber, would be avoided by putting all underground. The somewhat greater prime cost would be met in a very short time by the counter gain in having practically no renewals or repairs, and no deterioration of any moment in the wires laid underground. It would take an earthquake to dislocate or break them. The insulation would be equally good in all weathers. They would never stretch or come into cross contact. Were underground wires properly laid, each wrapped in its own coating of insulating material, interruptions from the causes that now so frequently occur would be completely stopped, and much annoyance and delay in the despatch of business avoided. As to the question of cost, it may be remembered that the prime cost of a telephonic exchange as a whole includes many items, of which that of the laying out of the wires is but one. The cost of instruments and of royalties on instruments, the cost of the wires which must be run inside offices and shops to connect with the outside lines, and the cost of the necessary batteries and switchboards, are so considerable as compared with that of the lines, that were underground lines each twice as costly as overhead lines the total prime cost would be but little raised, and the expense of working would be decidedly diminished.

A few weeks ago it was decided by Mr. Justice Stephen that local boards have power to prohibit overhead lines from crossing their streets. The Appeal Court reversed this decision, chiefly on the ground that the Wandsworth Board, who brought the action, had not proved the real existence of danger, the particular wires objected to being new and in good condition. But in the still more recent case before Mr. Justice Kay, in which the corporation of Bristol brought a somewhat similar action against the United Telephone Company, there were instances of obvious danger from badly arranged wires, and the Corporation possessed other rights than those of a mere local board. The United Telephone Company at once offered, rather than face the action, to acknowledge in full the rights of the Corporation as freeholders, and to submit the cases of alleged danger to arbitration. It would seem little less than monstrous if an equal right over their own property were not possessed by private freeholders. The latter will doubtless not be slow to discern the advantages secured to them by this admission, and will demand increased rates for wayleaves. A company having its wires underground, and working with the concurrence and sanction of the local authorities in the use of the streets or kerbways as channels for its lines, would find its business run more smoothly, and doubtless in the long run more cheaply, than one which persisted in the mistaken policy of running its wires overhead. There can be no doubt which way public opinion is tending. Let us be wise in time.

THE Detroit Board of Health has attacked a prominent nuisance on the northern lakes and St. Lawrence River in directing attention to the foul condition of the urinals and closets on excursion steamers. It recommends that they should be thoroughly cleansed several times daily with hot water.

PRINCESS BEATRICE—"Ma, there's a man at the door says he wants to buy Windsor Castle." Queen—"Mercy on us! Call the police. He must be a lunatic. There is not a man in England rich enough to buy Windsor Castle." Princess Beatrice—"But he is an American." Queen—"What is his business?" Princess Beatrice—"He is a plumber." Queen—"Ask him in."—*Philadelphia Call*.

ALL wells in districts of the city to which the mains of the water-works reach will be closed by the Board of Health of Toronto, Canada.

THE Boston Board of Health has decided to issue a new form of pass for vessels carrying rags which pass the quarantine station, which will enable them to land and discharge their cargo. The inspection at the quarantine station will be more rigid than formerly, especially while there is any danger from cholera.

THE INTERNATIONAL HEALTH EXHIBITION.

No. IX.

(Continued from page 148.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

LONDON WATER COMPANIES' EXHIBIT (CONTINUED).

BEFORE, however, proceeding to describe in detail the different exhibits of the eight Metropolitan water companies, it will be of interest to know what the charges are which are made by them to their consumers, and although no mention is made of these charges in this special exhibition, the following table has been compiled from a reliable source:

TABLE OF CHARGES MADE FOR WATER BY THE METROPOLITAN WATER COMPANIES.			
Name of Company.	Domestic Rate.	Scale on Annual Value.	Meter Supply for Trade Purposes. Scale per 1,000 gallons.
East London.....	5 per cent. on annual value.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	6d, 7d, 8d, and 9d.
New River.....	5 per cent. on annual value.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	6d, 6½d, 7d, and 7½d, if taken regularly; other supplies by agreement.
Southwark and Vauxhall.....	5 per cent. on annual value.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	6d, 7d, 8d, and 9d.
Lambeth.....	4s. 6d. to 10s. 6d.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	Varies according to level.
Grand Junction.....	4s. 6d. to 10s. 6d.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	6d, 7d, 8d, and 9d.
West Middlesex.....	4s. 6d. to 10s. 6d.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	Ditto. High service 25 per cent. additional.
Chelsea.....	4s. 6d. to 10s. 6d.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	Terms mutually agreed upon.
Kent.....	4s. 6d. to 10s. 6d.	Not exceeding £20, 4 per cent.; above £20, 3 per cent.	On terms mutually agreed, but small supplies with a minimum consumption guaranteed 10d. Large ditto, 7½d.

The New River Company is the oldest company, the opening ceremony having taken place on September 29, 1613. The display of this company includes some curious old prints, dated 1730, of different portions of their works, and among others a most interesting old engraving, dated 1749, of the water-works at London Bridge, erected 1582, by one Peter Morrys. This illustrates an undershot water-wheel, placed in one of the arches of London Bridge, which by the action of the tide drove a double set of four pumps. The wheel was kept always at the proper level by means of an ingenious mechanical arrangement worked by hand, which speaks well for the inventive genius of Peter Morrys. In comparison to this wheel a drawing close by can be studied with interest; it is that of a deep-well pumping-engine, designed in 1882 by Richard Morland & Son, and capable of raising four and a half million gallons of water per twenty-four hours from a depth of 200 feet.

Among the modern exhibits of this company is that of a 36-inch main standing on end, the top being used as a fernery, and on this main is painted the fact that 697 miles like it have been laid and are in use by the company; close to this big pipe they exhibit an old wooden main made from the trunk of a tree, which, though only recently removed, after being in the ground for upward of 100 years, seems very little the worse for it. The accompanying sketch, Fig. 1, shows the form of this wooden pipe, which is a sample of many miles which were at one time laid in the metropolis.

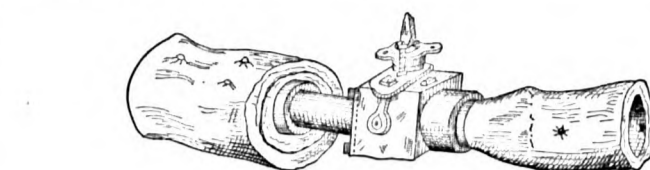


FIG. 4.

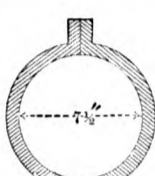


FIG. 2.

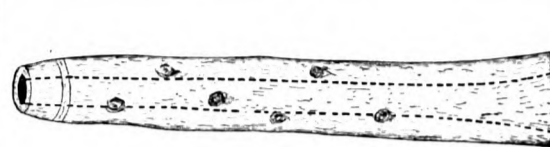


FIG. 1.

Of still older date is a specimen of lead main, evidently formed out of sheet-lead about one inch in thickness, turned up into a flange and beaten together, Fig. 2.

The display of modern water-fittings by this company is very extensive and complete. It embraces waste-preventing cisterns of a variety of patterns and by different makers, ball-valves, screw-down, and other high and low-pressure taps, stop-cocks, hydrants, sluice-valves, iron covers and boxes of all kinds, frost-hydrants, with movable stand-posts, pressure-gauges, meters for measuring water, callipers for measuring thicknesses of pipes, and a number of tools used by the turn-cocks and workmen employed by the company.

Some of the above fittings, which are by various makers, bear the stamp of the company, and no doubt all that are here shown meet with their approval or they would not be exhibited on their stand.

As some of this company's water-supply is derived from very deep wells, they show, through Messrs. Docwin & Co., the well-sinkers, a number of boring tools, among them being a hand-boring chisel, seventeen inches in width, used for breaking up material in forming deep bore-holes, also a diamond rock-drill, twenty-seven inches in diameter, with five out of the necessary forty diamonds set ready for use. In connection with this class of exhibits there are also shown some excellent specimens of core, twenty-four inches in diameter, taken from deep wells; one is from the chalk marl, at a depth of 554 feet from the surface of the ground, at Ware, in Hertfordshire, another is from the Devonian system at a depth of 985 feet from the surface of the ground, at Turnford, and the specimen from the greatest depth is also from the same system, at a level of 1,000 feet below the surface of the ground. Altogether nine specimens are exhibited of these cores. They contain visible fossils and possess some geological interest.

Before passing to the display of the East London Water Company, which adjoins the New River Company, it would be well to note the waste-water apparatus and patent sound-connector, which are fitted up on the floor and are in actual work. The meter is of the Deacon type, which is familiar to our readers; the "sound-connector" is a simple contrivance by which the waste-water inspector can apply his stethoscope without the necessity of a stop-cock. For use in the place of an ordinary wooden stethoscope or the turn-cock's key, one of Bell's waterphones is shown in connection with this exhibit.

The East London Water Company shows an interesting collection of water-meters, both ancient and modern. Among them may be found examples of the following:

The "Crown" meter, Everett's "Eureka" meter, Frost's "Manchester" positive meter, Kennedy's "Positive" meter, Parkinson's "Low-Pressure" ditto, Pocock's "Positive" meter, Siemens' and Halske's "Berlin" inferential meter, Siemens' "Inferential" meter, Stirling's "Positive low-pressure" meter, Tylor's "Inferential" meter, Worthington's positive piston meter.

It also shows one or two specimens of very old-fashioned meters, one of them stated to be over fifty years old, the name of the inventor not being known. This meter, it will be observed on reference to the sketch, Fig. 3, bears a close resemblance in many ways, as it does in its working, to that known as the Kennedy positive meter, which is probably well known to our readers as one used by many companies.

It also shows an example of very old work—viz., that of an old sluice-valve and the method of its attachment between two wooden water-mains, this arrangement being depicted in Fig. 4.

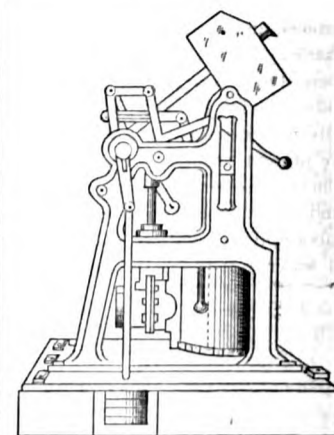


FIG. 3. Drawing of a Water-Meter 50 years old; name of inventor unknown.

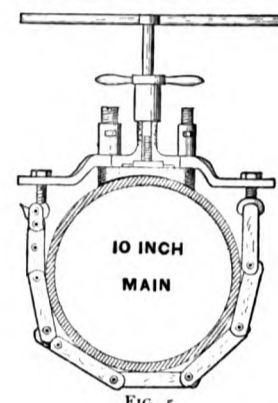


FIG. 5.

One of the principal exhibits of the Kent Water Company consists of a large stall containing specimens of cores from borings and wells taken from various strata and at different depths by means of machinery employed by the Aqueous Works and Diamond Rock-Boring Company. Some of these cores are specially interesting as exhibiting those of a peculiarly friable and soluble character, such, for example, as the potash salts, which are protected in glass bottles, and which were extracted from considerable depths by means of this machinery. It will be remembered that the Kent Company obtains all its water from deep wells, so that this display is quite typical.

The company also exhibits some water-meters. "Morris' Patent Tapping Apparatus" is shown attached to a section of a 10-inch main. This apparatus is intended for making house-service connections with mains while full of water at a high pressure. The accompanying diagram, Fig. 5, explains this apparatus.

This company also shows some ball fire-hydrants, but these are now being superseded by full-way valve-hydrants of different patterns that are well known. It shows, however, a glass case containing a number of specimens illustrative of some of the reasons for chokage in house-service water-pipes, in which the following examples are noted: A piece of lead-pipe twisted to such an extent as to completely close the orifice, done by plumbers in screwing up a piece of iron-pipe attachment; a ½-inch diameter wrought-iron bend, completely choked with rust; a similar sized piece of lead-pipe almost entirely closed by internal lamination of the lead; several specimens of defective plumbing, such as joints so badly wiped as to fill the pipes with solder, and other vagaries of the botch plumber; fibrous roots of trees are shown, which have been taken from pipes which they have entered in search of moisture, and there growing, have ended by completely choking up the passageway of the water.

In addition to the above several small diameter iron-pipes are shown, corroded by being buried in clay soils, and lead-pipe similarly affected by lime-mortar or other outside influences, and there are also a number of specimens shown of lead-pipes, which have been gnawed through by rats, either in search of water or for the purpose of sharpening their teeth after the manner of all rodents.

(TO BE CONTINUED.)

THE inspectors of buildings in St. Louis have discovered a general violation of the law requiring wooden joists to be not less than two inches from the walls of flues. They attribute this in part to the lack of system by which the masons and bricklayers and carpenters do their work without reference to the work of others.

Correspondence.

PLUMBING JOB.

BELVIDERE, June 30, 1884.

To the Editor of THE SANITARY ENGINEER :

I AM in the country doing some overhauling, where there has been sewer-gas. I have recommended some changes, as you will see by the rough drawing, and most respectfully ask your advice on the same. You will see where there is a 2-inch ventilator to 4-inch pipe, I want to run the 4-inch pipe to and through the roof. The water-closet on the 2-inch branch has a strainer between the floor and closet, and no ventilation at all. I want to take out the strainer, so that the closet can have a clear wash, and put in a proper trap, ventilate the trap and run the pipe up through the roof. If you kindly answer this and advise whether the closet should be changed for a tank-closet or not—the one in now is an old pan closet—you will greatly oblige,

Respectfully yours, J. W.

[The traps near the house-wall on the main-drain pipes should be outside rather than inside the wall, with a man-hole over them, and should have handholes in them for removal of rubbish (broken crockery, etc.), which sometimes is found there.]

The devices applied to the tops of the soil-pipes where they project through the roof are worse than useless. Nothing should be fixed to the upper ends of these pipes, unless, in some cases, wire baskets, to prevent mischievous children from dropping stones, etc., into them.

The pan-closets are poor articles; even if provided with a tank, as they often are.

With these exceptions, the changes suggested are advisable.]

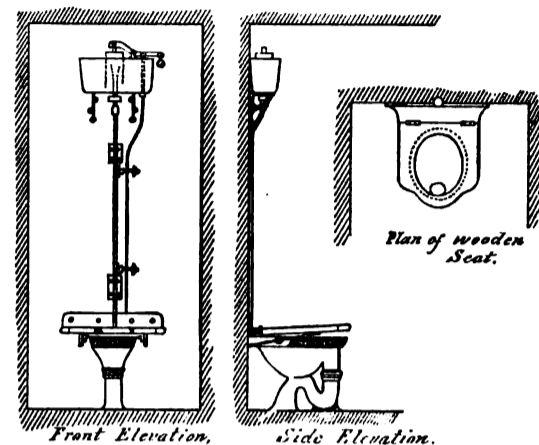
PUBLIC CONVENIENCES AT THE INTERNATIONAL HEALTH EXHIBITION.

LONDON, July 10, 1884.

To the Editor of THE SANITARY ENGINEER :

SOME particulars about the public conveniences* at the South Kensington Exhibition may be of interest to your readers.

The public lavatories, water-closets, and urinals distributed about the exhibition grounds are kept in admirable order and free from offense to either sight or smell. In this matter of public conveniences we in the United States might learn a profitable lesson from England, and notably



ARRANGEMENT OF WATER-CLOSETS, SHOWING SEAT ACTION.

from these arrangements at the exhibition. In each building is an attractively fitted up lavatory, with tiled walls, ample room to wash, and tables with combs and brushes, and mirrors on the walls. A charge of twopence is made for use of the lavatory, the attendant furnishing clean towels to each person, and a "brush off" for an additional penny or "thanks." The water-closets are kept locked, the charge for their use being one penny, and they are kept quite as clean as in any first-class hotel. No charge is made for use of the urinals. The accompanying sketches, to illustrate the construction of the urinals, may be of interest.

The fixtures at the Health Exhibition consist of 82 water-closets, 77 urinals, and 51 lavatories. There are four rooms for gentlemen and seven for ladies, all with attendants in charge, as previously stated. All this work was done by the Messrs. Doulton, Lambeth, Sanitary Engineering Works, Albert Embankment, London, the appliances and material used being of their manufacture. M.

PUMPING HOT WATER.*

HAVING had frequent inquiries as to what could be done in actual practice by donkey-pumps for feeding boilers from hot-wells, etc., and supposing that possibly sufficient vapor might be evolved from the water at lower temperatures than those ascertained by the rules to diminish seriously the quantity pumped, the author carried out a series of experiments to obtain actual results.

The donkey-pump employed was single-acting, having a ram three inches in diameter, with a length of stroke of seven inches. The pump was elevated to various heights; but the results being so nearly alike, allowing for difference in height and temperature, the table given below for fifteen feet may be taken as typical of all. The supply-tank

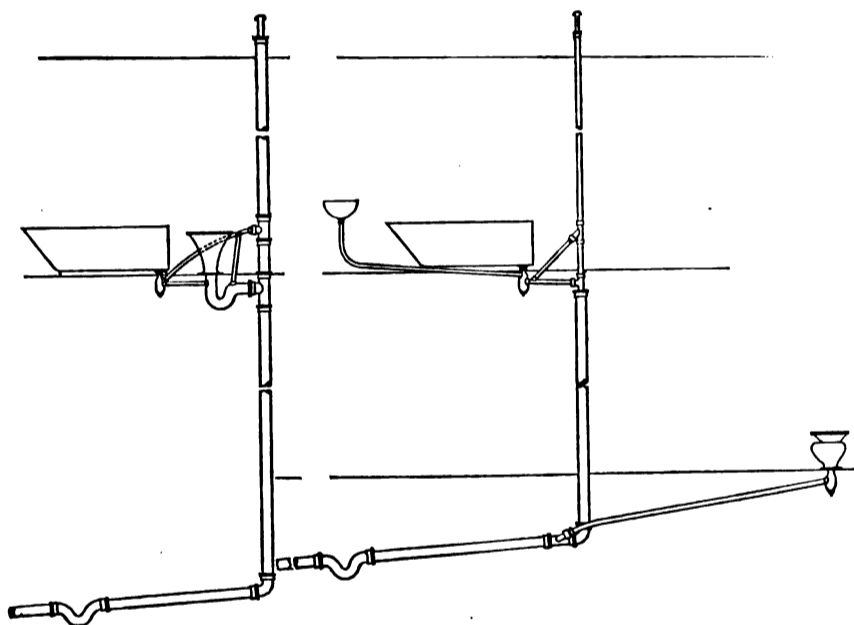


FIGURE 1.—THE ORIGINAL JOB.

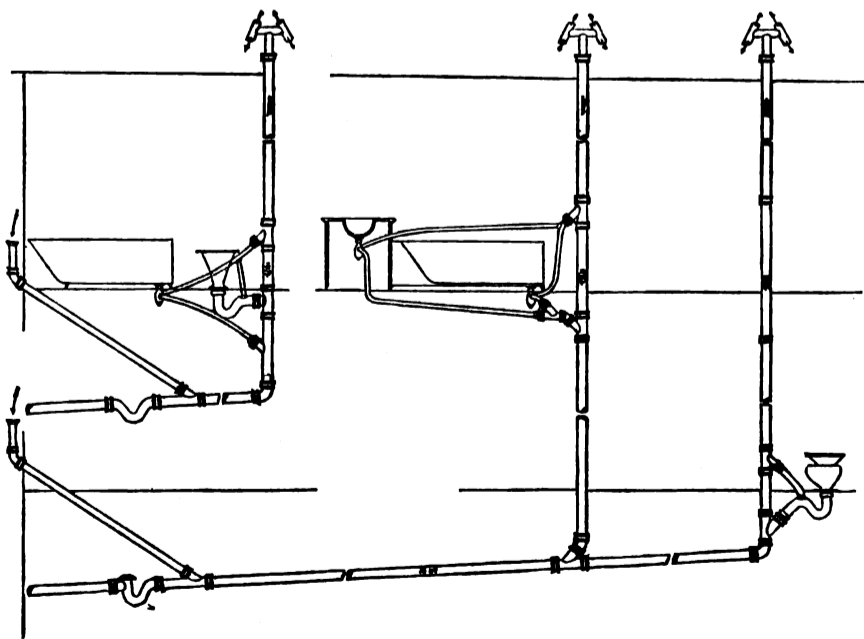
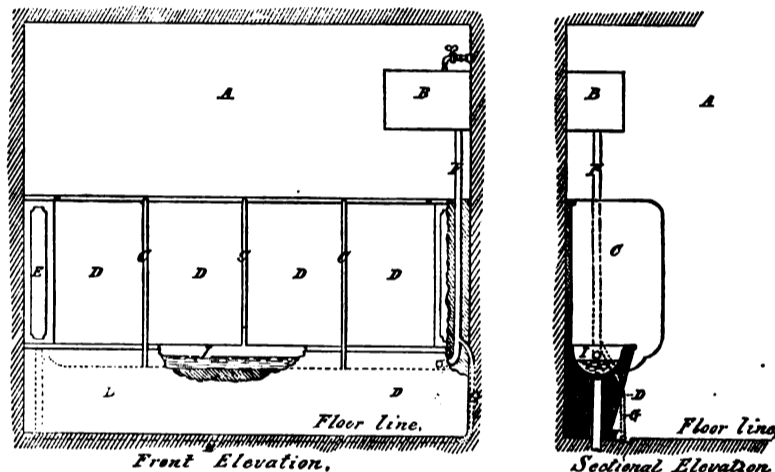


FIGURE 2.—THE JOB WITH PROPOSED CHANGES.



PUBLIC URINALS.

A—White-glazed Tiles. B—Flush-Tank. C—Veined Marble Stall Divisions. D—Black Enameled Slate. E—Black Enameled Slate, inlaid with Fancy Marble. F—Flushing-Pipe to Trough. G—Flushing-Pipe to Foot-Channel. H—Foot-Channel. I—Urinal-Trough of Yellow Potteryware.

stood on the ground, the water in it being heated by a jet of steam. The suction-pipe was led direct to the valve-box, with only one bend, and the delivery-tank was elevated to about the same level as the pump, the water being discharged through a valve loaded to sixty pounds per square inch. A large cock, fitted to the bottom of the delivery-tank, was kept open while the speed of the pump was being regulated, and was shut as soon as the trial commenced. A certain depth of water always existed in the tank while the cock was open; this was carefully gauged and deducted at the end of the trial. The speed of the pump was regulated as nearly as possible to that given in the first column, and on each trial, as soon as the exact number of strokes was completed, the pump was stopped.

It will be seen that the results agree closely with those given by the rules, the falling off in the quantity at the higher temperatures being most probably due to the friction of the water in passing through the pipes, valves, etc. It will also be observed that the speed of the pump had to be reduced for the higher temperatures, the speeds stated in the list being found to give the best results.

RESULTS OF EXPERIMENT NO. 3, WITH THE PUMP FIFTEEN FEET ABOVE THE WATER-LEVEL.

Revolutions per Minute.	Temperature Fahrenheit.	Hot Water Pumped per Minute, Cubic Inches.
70	70°	3.430
70	100	3.430
70	120	3.430
70	140	3.430
70	160	3.286
60	170	2.682
50	180	2.180

Each quantity stated is the mean of several trials. Above 180° Fahrenheit scarcely any water could be pumped. According to Regnault, 185° would be about the limiting temperature at fifteen feet.

* Read before the Institution of Civil Engineers, by Henry James Coles, Assoc. M. Inst. C. E.

PHILADELPHIA PUBLIC SCHOOLS.

(Special correspondence of THE SANITARY ENGINEER.)

THE Sanitary Committee of the Board of Health of Philadelphia has presented the following resolution to that body for adoption, in connection with a continued report as to the condition of the schools of the city: *Resolved*, That the attention of the Board of Public Education be called to the following statement of defects in the drainage, etc., of sundry public schools, which have a tendency to be prejudicial to the health of the school children, and that they be requested to give the subject immediate attention. The Jackson schools, Twelfth and Federal Streets, are two separate buildings, using four large privy-wells, connected by drain-pipes, the one nearest the sewer carrying off the overflow for all. All the surface and roof-drainage is discharged into these wells. The stationary wash-stands are connected with the drain-pipes to the privy-wells, and are without traps. In the new building are two water-closets discharging into privy-wells. The soil-pipes from water-closets, like those in all schools examined thus far, are unventilated. One service-pipe supplies hydrants, water-closets, and wash-stands, and when hydrants are in use the supply is cut off from water-closets and wash-stands. All of these privy-wells should be cleaned to the bottom, filled with clean dirt or ashes, and perfectly tight basins constructed in cement, properly connected with the sewer and flushed; a sufficient water-supply provided for the water-closets, and the wash-basins properly trapped.

Jeremiah Nichols School, Sixteenth and Wharton Streets.—There are two large privy-wells in the yard. Two water-closets and the wash-stands in the building discharge into the privy-well. The soil-pipe has only one trap, and the closed traps are defective, losing their water-seal directly after use. There being no sewer in the street, the use of the water-closets should be abandoned and they should be cut off from the privy-wells, and no fluid matter discharged into said wells until a sewer is constructed.

James Alcorn School, Thirty-fourth and Wharton Streets.—Two common privy-wells in the yard. Two water-closets and two wash-stands in the building are discharging into said wells. The closet on the first floor has a poor water-supply, and that on the second floor has none at all except on Sundays. The traps are very inferior. The use of the water-closets should be abandoned and the same cut off from the privy-wells, and no fluid matter discharged into said wells until a sewer is constructed.

Hollingsworth School, Locust Street, east of Fifteenth Street.—The wash-basins on each floor have their waste-pipes untrapped and connected with the water-closet soil-pipe. The waste-pipes should be trapped.

Locust Street School, Twelfth and Locust Streets.—Water-closets in the building discharge into privy-wells. The privy-wells should be cleaned, abandoned, and water-closets with proper flushings should be constructed.

Curtin School, Twentieth and Catharine Streets.—The privy-well is close to the school building and needs ventilation. The ventilation should be extended above the house.

Such is the condition of the school-houses of Philadelphia in regard to sanitary arrangements, and which tend to make the atmosphere in which the thousands of small school children of the city are compelled to exist in for at least five hours each day.

The resolution was adopted by the Health Board and direction given that copies of the report be sent to the sectional boards in which the different schools are situated and also to the Board of Education.

THE SOCIAL SCIENCE CONGRESS.—Among the special questions which have been arranged for discussion at the next Social Science Congress, which is to be held at Birmingham, England, in September, are the following: Department of Jurisprudence and the Amendment of the Law: What reforms are desirable in the law relating to the arrest and continued detention of alleged lunatics, and to the control of their property? Department of Health: 1. What is the best method of dealing with (a) town sewage, (b) the products of house and street scavenging, and (c) the products of combustion? 2. What are the best means, legislative or other, of securing those improvements in the dwellings of the poor which are essential to the welfare of the community? 3. How far may the average death-rate of a population be considered an efficient test of its sanitary condition? and by what means can the high death-rate of children be reduced?—*The Lancet*.

THE quarterly meeting of the Illinois State Board of Health, in Springfield, on the 2d inst., requested the Secretary to secure the thorough sanitary organization of the State, to be in readiness for possible cholera invasion.

WATER-WORKS REPORTS FOR 1883.

City.	Population in 1880.
Baltimore, Md.	332,313
Cincinnati, O.	255,139
Cleveland, O.	160,146
Buffalo, N. Y.	155,134
Montreal, Canada.	140,747
Newark, N. J.	136,508

The water-works of these six cities are owned by the municipalities. Baltimore has a gravity supply, and the others pump their water. Buffalo pumps into a reservoir and also directly into the mains. The remaining four pump into reservoirs. The pumping at Montreal is partly by water-power and partly by steam-power. The others all employ steam-power.

In a country of the size of North America there are several towns of the same name, and it is safer to put on an official report the name of the State. Of the six reports above mentioned, three would give a foreigner no idea of the locality where they were published, and only one bears in its title the name of the State. Buffalo is given as in the State of New York, and the printer's imprint on the Cleveland and Newark reports designate the State, but the Baltimore report nowhere indicates from which one of the four postal towns bearing that name it is issued, nor does the Cincinnati report show in which one of the eight States having a post office of that name the works reported on are situated, while the future collector of American statistics will be at a loss to tell whether the Montreal report was issued from the Dominion of Canada, from Virginia, or from Missouri.

Passing beyond the title-page, the difficulties of getting at definite information from most of the reports are very great. There are certain items which managers of other works want to know for comparison of cost and efficiency, which ought to be grouped together and succinctly presented; such as the total cost of the works, the indebtedness and rate of interest paid, the extent of the works, their capacity for supply, their actual supply, the cost of operation, and the sources and amount of revenue. Most of these can be picked out of these reports by careful study, but they are scattered around in such unexpected places, and often presented in such an obscure manner that it makes it hard work to discover anything. Book-keeper's accounts copied out of a ledger are valuable for reference by taxpayers, but it is not easy to determine actual cost and operating expenses from them.

The reports now under notice are generally full and satisfactory after sufficient search for data, but it may be remarked that in Cincinnati, Buffalo, and Montreal no statement is given of the amount of water metered, though the number of meters and the revenue derived from them are given, and in Newark no mention at all is made of the number of meters used, the amount of water measured, or the revenue therefrom.

The Montreal report contains no statements of the cost of the water-works or the bonded debt.

The quantity of water used by each consumer varies amazingly, as will be seen by the following statement compiled from the reports:

	Daily consumption in gallons.	Number of taps.	Gallons per tap daily.
Baltimore	28,071,312	55,563	505
Cincinnati	19,401,200	25,870	750
Cleveland	14,212,144	14,841	958
Buffalo	23,475,192	14,127	1,662
Montreal	12,464,400	26,975	462
Newark	9,672,578	13,592	712

There does not seem to be any good reason why a consumer in Buffalo should use three times as much water as one in Baltimore, and nearly twice as much as one in Cleveland. It may be that in the continuous pumping required for a direct supply the pumps register more water than they actually deliver. If this is not the case there must be excessive waste in Buffalo, or else a very large consumption of water by manufactories. The proportion of the supply which is measured by meters not being given, this point cannot be settled by reference to the report. As there are only 105 meters in use, and they furnish 20 per cent. of the total revenue, it is probable that there is a large amount of water passed through them for elevators and railroad water-tanks.

A comparison of the proportional number of taps metered and the amount of water measured, and the revenue therefrom, in the cities under consideration, shows that

there is little probability of being able to draw any conclusions from the record of one city which will be applicable to another:

	Number of meters in use.	Percentage of taps metered.	Percentage of water measured.	Percentage of total revenue derived from metered water.
Baltimore	763	1½	8¾	11
Cincinnati	1,402	5½	...	27
Cleveland	913	6½	20½	40½
Buffalo	105	0¼	...	20
Montreal	413	1½	...	9

None of these cities have undertaken to measure the water supplied to dwellings.

The financial management of these works varies as much as the quantity of water supplied. In Cincinnati and Cleveland the revenues seem to have been devoted to diminishing the debt to a great extent, while in Baltimore, Buffalo, and Newark the indebtedness is but little less than the cost of the works, and consequently the annual interest burden is heavy. In each city (except Newark, where the interest charge is greater in proportion to the number of takers than in any of the other cases) the consumer is made to pay annually a sum greater than the aggregate cost of supplying him with water.

	Annual cost per tap.			Annual revenue collected per tap.
	For maintenance and operation.	For interest on water debt.	Total.	
Baltimore	\$1.78	\$8.27	\$10.05	\$10.99
Cincinnati	8.01	3.83	11.84	20.65
Cleveland	4.93	4.77	9.70	18.50
Buffalo	6.17	13.31	19.48	22.90
Montreal	2.58	11.12	13.70	15.49
Newark	7.24	16.43	23.67	17.37

The fact that the general well-being is increased by a good water-supply, and that therefore property should bear a share of the burden and not leave it all to those who use water in their houses, does not seem to be recognized in any of these cities except Buffalo, where the city contributes out of taxation \$100,000 per annum, and in Cleveland, where the city pays \$39,650 of the interest on the debt. In Newark \$100,000 is appropriated from the tax levy to cover the deficiency of revenue, but it is not done in recognition of the equity of making property contribute to the cost of the water-supply, but simply from the necessities of the case, the revenue derived from consumers not being sufficient to meet the expense of maintenance and interest.

Not only is the cost per tap greater in Newark than in the other five cities, but also the cost of delivering a certain quantity of water, as the following statement shows:

	Millions of gallons delivered.	Cost of delivering each million gallons.		
		Maintenance.	Interest.	Total.
Baltimore	10,216	\$0.68	\$44.95	\$54.63
Cincinnati	7,664	27.05	13.06	40.11
Cleveland	5,187	14.11	13.62	27.73
Buffalo	8,568	10.18	21.82	32.00
Montreal	4,599	10.78	65.23	76.01
Newark	3,530	27.87	63.35	91.22

One reason for the greater expense of furnishing water in Cincinnati than in Cleveland is that the water is pumped one-third higher, and coal costs twice as much in the former city. In Newark and Cleveland the lift is about the same, but coal in Cleveland costs \$1.65 per ton, and in Newark \$4.39. In Montreal the pumping is partly done by water-power, which reduces the cost. The lift is the same as at Cleveland and Newark, but the steam-engines are not as efficient, as will be seen from the amount of coal consumed to deliver one million gallons into the reservoirs:

	Pounds of coal consumed in delivering one million gals.
Cincinnati	4,603
Cleveland	3,165
Buffalo	2,016
Montreal	5,166
Newark	2,890

The duty of the Buffalo engines is about ten per cent. greater than that of the Cleveland engines, and thirty per

cent. greater than that of the Cincinnati engines, and about the same as that of the Newark engines, or equivalent to 480,000 pounds of water lifted one foot with one pound of coal.

All of these reports are neatly gotten up, and contain elaborate tables of details, but, as was before stated, they are so differently arranged as to make a comparison of the works a task of considerable difficulty.

THE NEW EASTERN DISTRICT (BROOKLYN) WATER-MAIN.

COMPILED FROM THE WATER PURVEYOR'S (P. MILNE, JR.)
RECORDS OF BROOKLYN.

ALL of the pipe is now laid, amounting to over 29,000 feet, distributed as follows: From the gate-chamber at Ridgewood reservoir through Cypress Hill plank-road to Cooper Avenue, and through the same to Bushwick Avenue, and through the same as far as Flushing Avenue. We have laid 18,300 feet of 36-inch pipe from this point, corner of Flushing and Bushwick Avenues. We continue through Bushwick Avenue to Maujer Street with 30-inch pipe, its length being 3,700 feet, and from corner of Bushwick Avenue and Maujer Street we laid through Maujer Street to and through South First Street to First Street 7,674 feet of 20-inch pipe.

We connect with the old system of distribution at the following points: Flushing and Bushwick Avenues with 20-inch, Graham Avenue and Maujer Street with 12-inch, Union Avenue and Maujer Street with 20-inch, Fifth Street and South First Street with 12-inch, and at South First Street and First Street with 12-inch.

The new main is controlled by six gates, distributed as follows: One at Knickerbocker and Cooper Avenues, one at Bushwick and Cooper Avenues, one at Grove Street and Bushwick Avenue, two at Flushing and Bushwick Avenues, and one in the gate-chamber at the reservoir.

We calculated that a year would elapse before the work could be completed. It is now thirteen months since we commenced it. We were delayed one month by the foundries shutting down last August. The work from beginning to end is important in all its details. The last part of it is the most critical in all respects—viz., that of making the final connection at the efflux-chamber of Ridgewood reservoir.

The gate-chamber is located north of the efflux-chamber, is a part of the reservoir, is constructed of granite, is 33 feet long, 19 feet wide, and 29 feet deep, all outside measures; its walls are 4 feet thick at the ends, and 5 feet thick at the sides. The inside measurement of the depth of the gate-chamber is 25 feet. At the bottom of this chamber are located three gates. Two of them are 36 inches in diameter, and one 48 inches in diameter. When the gate-chamber was constructed, in the year 1857, three trumpet-shaped pipes were built in the masonry of the wall which separates the gate-chamber from the efflux-chamber, with two of which the first 36-inch main laid was connected in the year 1858, and the 48-inch main laid in 1867 and 1868 was then connected with one. The remaining trumpet-shaped pipe was sealed with a bulkhead of masonry and timber inside of it. This pipe is located between the other two. All three project into the efflux-chamber about six inches, and the bottom edge of each pipe is one inch from the bottom of the efflux-chamber. In order to connect the new main with the reservoir it was first necessary to place a gate in the gate-chamber to control the flow. This gate, with its flanges and spigots, weighs about 6,000 pounds, was lowered into its place in the gate-chamber and then made fast to the spigot end of the trumpet-shaped pipe leading from the reservoir on the one side and to the end of the new main on the other.

We then proceeded to undertake that portion of the work which is both interesting and difficult—viz., to sink a cast-iron framework on each side of the walls of the efflux-chamber, and fit into this framework two walls of 3-inch timber placed at right angles with the walls of the efflux-chamber, forming a box-like structure, not water-tight, but answering the purpose of preventing the flow of water which passes into the present 36 and 48-inch mains at the rate of between four and five feet per second from interfering with the work of the diver. The timber walls on each side are

scarcely two feet from the edge of the mouths of the present distributing-mains.

The diver, clad in his submarine armor, and in twenty feet of water, works for three hours at a time, and with hammer and chisel is slowly making progress through a wall of 20-inch hard brick and harder cement. Back of this wall is a partition of two thicknesses of timber about six inches thick. When this work is done the water from the efflux-chamber will have reached the face of the new gate in the gate-chamber, and probably in two weeks' time we will be prepared to permit the flow into the new main.

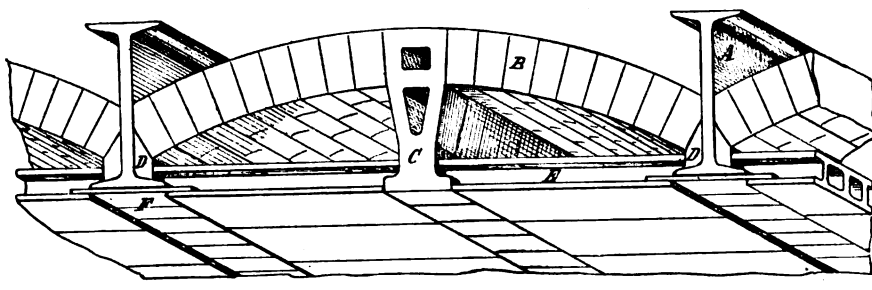
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

FIRE-PROOF CEILING.

OUR illustration represents a novel fire-proof ceiling, the invention of Mr. Gustavus W. Rader, of this city.

The intention is to form the ceiling of tiles or plates of fire-clay, or other suitable refractory clays, of such dimensions and in such manner as to remove the objection made to large plates of their liability to break in the centre and fall. To this end the common brick arch usually employed is supported on special skewbacks, B, B, and keyed with a special fire-clay keystone, C, from whose under side projects



a pendant, as shown. On the ledges formed by the under flanges of the iron beams or joists, and on corresponding ledges on the keystone pendants, are laid short tubular pieces, D, rabbeted on their under side, so that their plane will be on a level with the under side of the keystone extension, which comes somewhat below the line of the iron joists. The bottoms of the iron beams are also covered by plates of fire-proof materials, which plates are inserted into the hollows of the tiles D.

The manufacturers are G. W. Rader & Co., of 613 West Fifty-first Street, New York City.

FOUL WATER USED FOR MAKING MINERAL WATERS.

WE quote here the greater portion of Dr. Edson's report to Sanitary Superintendent Day on the condition of wells used by manufacturers of mineral waters in this city:

HEALTH DEPARTMENT OF THE CITY
OF NEW YORK,
SANITARY BUREAU, SECOND DIVISION,
NEW YORK, July 2, 1884.

To W. DE F. DAY, M. D., Sanitary Superintendent:

Sir—I have the honor to transmit herewith the results of nine analyses, made by Dr. E. Waller, of water from so-called artesian-wells situated in this city. The water from all those wells, with the single exception of a well at the corner of Greenwich and Watts Streets, is used by manufacturers of soda and mineral waters in the preparation of

these beverages. The water receives no treatment at their hands which would render it more safe for use. The depth of these wells is under 70 feet, except one, which is 169 feet. The water from this had a marked urinary odor. Dr. Waller pronounces the water from one of these wells to be of doubtful quality, while he unhesitatingly characterizes that of the others as "bad," and extremely dangerous for drinking purposes. The explanation of this fact is to be found in the geological formation of our island. I give the result of the doctor's researches on this subject:

"The strata composing the island, originally deposited in a horizontal position, have been thrown into folds, probably by the geological changes effected by the eruption of the material now forming the Palisades (the trap—a solidified form of lava). After that the valley of the Hudson became the bed of an immense glacier, which ground off the top of the ridges, at the same time filling the hollows with the boulders, sand, and other detritus which it carried with it. The result is that our island consists of the up-turned edges of the strata so worn off, and any water falling on the surface soaks in, guided by the trend of the strata, to make its appearance in a well (wherever such may be sunk) on the island. In other words, the water in any of the wells, however deep, is the drainage from the district closely adjacent to the spot where the well is sunk."

The importance of compelling the manufacturers of beverages to use pure and wholesome water is manifest when it is remembered how frequently mineral and carbonated waters are prescribed by physicians for invalids and persons in delicate health, who are most liable to contract disease. The following facts, which I venture to quote, may be of interest:

"Of the 142 epidemics of typhoid fever, observed in various localities, in 125 cases the epidemic had no other determining cause than the use of water containing impurities." (Reports Local Government Board, England.)

"If any taint, however small, of infective material gets access to wells or other sources of drinking-water, it imparts to large volumes of water the power of propagating disease." (Mem. Local Gov. Bd., Eng., July 13, 1883.)

"Water is the great carrier of infective germs. Pure water should be available at all seasons, but this is especially necessary in warm weather." (Lancet, June 30, 1883.)

CYRUS EDSON, M. D.,
Chief Inspector.

About the same time with the presentation of Dr. Edson's report, Dr. E. H. Bartley, of Brooklyn, presented to Dr. Raymond, Commissioner of Health, the result of examinations of soda-water. His examination of the waters from various soda-fountains in Brooklyn was made to ascertain whether the plain soda was free from lead and copper. In several cases he found both metals in the water first drawn, in quantities sufficient to be harmful. The copper he thinks is derived from direct contact with copper or brass fittings, which may give rise to a certain amount of carbonate of copper. The lead, found in greater quantity than copper in the carbonated waters, is probably derived from tin-lined lead pipe, or from block-tin pipes containing lead, or from the solder used to solder the joints.

The use of copper tin-lined cylinders for storing the water charged with carbonic-acid is objected to. One such cylinder, opened to permit Dr. Bartley to see its condition, had the tin lining worn away from a considerable part of the surface, and the water contained a trace of copper.

Dr. Bartley also finds that with some of the reservoirs used for storing the syrup passed through a considerable length of brass tubing, and as the syrups commonly used are acid, considerable copper is taken up.

Commissioner Raymond has decided to issue an order prohibiting the storing of syrups in anything but glass vessels, doing away with anything in the shape of a faucet or pipe which shall expose in any way the syrups or soda-water to the possibility of taking up poisonous ingredients.

ANALYSIS OF WATER.—RESULTS IN GRAINS PER U. S. GALLON.

Sample Marked.	Appearance, Color.	Odor when heated to 100° Fahr.	Chlorine in Chlorides.	Equivalent to Sodium Chloride.	Phosphoric Acid in Phosphates.	Nitrogen in Nitrates and Nitrites.	Free Ammonia.	Albuminoid Ammonia.	Nitrites.	Oxygen absorbed at 80° Fahr.		Hardness equivalent to Carbonate of Lime.		Organic and Volatile Matter.	Mineral Matter.	Total solids, dried at 230° Fahr.	Depth of Well.	Conclusions.
										In two Minutes.	In three Hours.	Before Boiling.	After Boiling.					
1277	Clear, light bluish.	None.	6.213	10.238	None.	1.309	0.0433	0.0120	Present.	...	...	10.497	7.873	8.748	36.740	45.488	60 ft.	Bad.
1278	Slightly turbid, lt. blue.	Faint oily.	5.913	9.774	None.	1.308	0.0351	0.0145	Decided.	...	...	15.950	7.208	11.664	35.282	46.946	60 "	Bad.
1279	Faint turbid, brownish.	None.	4.801	7.911	None.	2.862	0.0239	0.0049	Trace.	...	...	23.934	17.145	19.244	61.525	80.770	40 "	Bad.
1280	Clear, light bluish.	None.	0.941	1.551	None.	0.576	None.	0.0032	None.	...	...	4.584	4.269	4.374	10.206	14.580	30 "	Doubtful
1281	Clear, greenish.	Faint.	0.828	1.365	Trace.	...	...	...	None.	...	...	4.801	4.453	4.374	11.080	15.454	30 "	Doubtful
1282	Turbid, brownish.	Ft. marshy.	4.800	7.911	Trace.	1.750	0.014	0.0047	Much.	...	...	12.847	11.168	14.579	51.903	66.482	60 "	Bad.
1286	Clear, bluish green.	None.	1.882	3.102	None.	1.254	0.350	0.0021	None.	...	...	6.078	6.043	5.540	17.495	23.035	50 "	Bad.
1290	Clear, light blue.	Of urine.	3.648	6.011	Ft. trace.	0.239	0.0014	0.0047	Trace.	...	...	19.084	6.043	9.331	40.239	49.570	160 "	Bad.
1287	Clear, greenish.	Faint.	7.625	12.567	None.	2.304	0.0014	0.0056	None.	...	...	12.299	5.755	18.370	44.322	62.692	71 "	Bad.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JULY 12, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.					Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.	
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.						
NORTH ATLANTIC CITIES.																										
Portland.....	Maine.....	35,000	6	8.9					1			1					1									
Boston.....	Mass.....	435,000	168	20.1	71	42.2	12		31		17	3					9		4	1			1		1	
Lowell.....	Mass.....	71,500	39	28.4	14	35.8	2		5		9						1		1							
Worcester.....	Mass.....	60,000	31	23.4	16	51.6	1		7		5	4					3		1							
Fall River.....	Mass.....	67,000	42	32.6	27	64.2	2		8		17						1		2			1	2			
New Haven.....	Conn.....	60,500	50	37.4	28	56.0	3		8		19	1					1		1							
Providence.....	R. I.....	125,000	32	18.8	13	40.6			7		7	1					1		1							
Total.....		872,000	368	21.9	169	45.9	18	2	61	1	70	10		4		3	15		10	1	1	3			1	
EASTERN CITIES.																										
Albany.....	New York.....	103,000	54	27.3	31	57.4			4		16	1				2	1								2	
New York.....	New York.....	1,355,000	955	36.7	600	62.8	27	2	86		351	16	2	4	5	14	37		22		23	5			16	
Brooklyn.....	New York.....	670,000	414	32.1	266	64.2	15		36	3	163	4		2	9	4	10		11	2	4	1			9	
Hudson County.....	New Jersey.....	225,000	123	28.4	70	56.9	4	2	10	2	35	1			3		4		1			7				
Newark.....	New Jersey.....	154,000	69	23.8	38	55.0	2	1	7	1	25						5		1			2				
Philadelphia.....	Pa.....	940,000	475	26.8	264	55.5	14		47	1	121	5	2	9	1	5	10	4	5		6	1	1		3	
Wilmington.....	Delaware.....	50,000	28	29.1	20	71.4	1				11			1												
Total.....		3,497,000	2,118	31.5	1,289	60.8	63	5	190	10	722	27	4	17	19	25	67	4	39	2	33	16	1		30	
LAKE CITIES.																										
Buffalo.....	New York.....																									
Rochester.....	New York.....																									
Cleveland.....	Ohio.....	210,000	81	20.1	54	66.6			4		28	2		2	1		5	1	2		4				2	
Detroit.....	Michigan.....	140,000	96	35.7	68	70.8	1	1	7	3	30	4		4			1	1	1		2					
Chicago.....	Illinois.....	650,000	372	29.8	277	74.4	6	2	22	2	120	7		4	3	6	10	1	7		21	1			2	
Milwaukee.....	Wisconsin.....																									
Total.....		1,000,000	549	28.6	399	72.6	7	3	33	5	178	13		6	4	6	16	2	10		27	1			4	
RIVER CITIES.																										
Pittsburg.....	Pa.....	210,000	80	19.8	53	66.2	1		2		15	4		1		2	3	1	1		4	1			1	
Cincinnati.....	Ohio.....	275,600	110	20.7	61	55.4	3	2	12	1	8	1		2		1	3	1	1		1	1			2	
Louisville.....	Ky.....	137,000	48	18.2	14	29.1	1	1	4		1						2		1							
Indianapolis.....	Ind.....	94,000	43	23.8	25	58.1		1	5		1			1		1		1								
Minneapolis.....	Minn.....	100,000	38	30.2	42	72.4	1		3		27	4		1		1										
Evansville.....	Ind.....	34,000	19	29.1	13	68.4	1		2		4															
St. Louis.....	Mo.....	375,000	197	27.3	113	57.3	8		14		58	4		6	7	4	1	3	4		2	1			1	
Total.....		1,225,600	555	28.5	321	57.8	15	4	42	1	114	13		11	8	9	9	5	7		9	4			5	
SOUTHERN CITIES.																										
District of Columbia.....	Wh.....	133,800	46	17.9	13	28.2	3		7		6			1		1										
Richmond.....	Va.....	69,300	48	36.0	33	66.6	1		10		15			2	1		2								2	
Charleston.....	S. C.....	41,000	12	15.2	7	58.3		1			2															
Atlanta.....	Geo.....	32,400	35	56.2	18	51.4	1		5		3			2			1									
Savannah.....	Geo.....	25,000	10	20.8	3	30.0			1		1															
Nashville.....	Tenn.....	27,800	29	54.3	14	48.2			5		3			1	1				1							
Augusta.....	Geo.....	30,000	11	19.0	6	54.5			1		4			1												
Memphis.....	Tenn.....	20,000	7	18.2	2	21.4			1		3															
New Orleans.....	La.....	17,000	14	42.9	3	33.4			3		3			1	1				1							
Total White.....		524,600	204	20.2	82	40.1	13	1	24		31	1		2	11	2	3		2		1	1				
Total Colored.....		283,900	240	44.1	123	51.2	3		40		40			7	5	1	1	1	6	1	3	1			3	
Total in 33 U. S. Cities.....		7,402,500	4,034	28.3	2,383	59.0	119	15	390	17	1155	65	4	47	47	46	111	12	74	4	71	28	4	43		
July 14, 1883—Total in 32 U. S. Cities.....		7,155,900	4,293	31.2	2,454	57.1	110	16	387	17	1391	79	8	51	47	41	106	9	32		53	28	20	14		
June 28.....	Total in 28 English Cities.....	8,762,354	3,230	19.2			118				90	27		42		50					144		39	122		
" 28.....	8 Scottish Cities.....	1,254,607	500	20.6			17				13	7		10		8					15			32		
" 28.....	16 Irish Cities.....	858,660	405	24.5			7		70		6			4		4								5		
" 28.....	139 German Cities.....																									
" 28.....	15 Swiss Cities.....																									
" 28.....	15 Swiss Cities.....																									

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

For the week ending July 12, 1884, in 33 cities of the United States, with an aggregate population of 7,402,500, there were 4,034 deaths, which is equivalent to an annual death-rate of 28.3 per 1,000. This rate is lower than that of the corresponding week last year, which was 31.2, as will be seen by reference to the table above. For the North Atlantic cities the rate was 21.9; for the Eastern cities, 31.5; for the Lake cities, 28.6; for the River cities, 23.5, and in the Southern cities, for the whites, 20.2, and for the colored, 44.1 per 1,000. In New York City the death-rate rose to 36.7, in Brooklyn to 32.1, and in Chicago to 29.8. As was the case last week, this increased mortality has fallen chiefly on the children, 59.0 per cent. of the deaths being children under 5 years of age, and, as before, this is largely due to diarrheal diseases, which caused 28.6 per cent. of all deaths. In the North Atlantic cities they caused 18.9; in the Eastern cities, 34.0; in the Lake cities, 13.2; in the River cities, 11.9, and in the Southern cities, for the whites, 15.1, and for the colored, 16.6 per cent. of all deaths.

Accidents caused 2.9 per cent. of all deaths, consumption 9.6, diphtheria 1.6, typhoid fever 1.1, malarial fevers 1.1, scarlet fever 1.1, pneumonia 2.7, bronchitis 1.7, and measles 1.7; the latter disease prevailed

chiefly in the Lake cities, where it caused 4.9 per cent. of the deaths. Deaths from small-pox were reported in Philadelphia and New Orleans only.

BOSTON, Mass.—C. E. Davis, Jr., reports 12 new cases of diphtheria, 47 of scarlet fever, and 25 of typhoid fever.

DETROIT, Mich.—Dr. O. W. Wight reports 16 new cases of scarlet fever and 28 of diphtheria.

BALTIMORE, Md.—The weekly report of the Health Officer records 216 deaths, of which 132, or 61.1 per cent., were under 5 years of age. Diphtheria caused 4 deaths, croup 2, whooping-cough 4, measles 1, typhoid fever 2, malarial fevers 2, diarrheal diseases 81, acute lung diseases 9, consumption 20, and violence 9.

MASSACHUSETTS.—In 103 towns of the State, with an aggregate population of 1,388,574, there were reported during the week ending July 5 410 deaths, which is equivalent to an annual death-rate of 15.3 per 1,000. The number of decedents under 5 years of age was 191, or 46.5 per cent. of all deaths. The zymotic diseases caused 73 deaths, including diarrheal diseases 37, cerebro-spinal meningitis 11, diphtheria and croup 10, scarlet fever 5, typhoid fever 5, whooping-cough 4, and measles 1. To consumption were attributed 60 deaths, and to lung diseases 22.

RICHMOND, Va.—During the month of June there were 195 deaths; whites 87, colored 108. The annual death-rate for the whole population was 31.8 per 1,000; for the whites 25.4, and for the colored 40.0. Of the decedents 102 were under 5 years of age. Typhoid fever caused 12 deaths, malarial fevers 9, diarrheal diseases 59, acute lung diseases 4, consumption 24, and violence 4.

NASHVILLE, Tenn.—For the month of June there were 89 deaths; whites 45, colored 44. The annual

death-rate for the whole population was 21.36 per 1,000, or 16.65 for the whites and 29.04 for the colored. This death-rate is much below the average of the rates of the corresponding month for the past ten years. Small-pox caused 2 deaths, diphtheria 1, typhoid fever 2, malarial fevers 2, diarrheal diseases 16, consumption 17, pneumonia 2, and violence 2.

CHICAGO, Ill.—The Health Officer, in his report for June, records 1,041 deaths, of which 569, or 54.6 per cent., were under 5 years of age. The number of deaths is greater than that of any corresponding month for the last four years. Measles caused 85 deaths, scarlet fever 26, diphtheria 35, croup 10, whooping-cough 10, typhoid fever 23, malarial fevers 6, diarrheal diseases 94, consumption 95, acute lung diseases 90, and violence 61.

MILWAUKEE, Wis.—For the month of June there were reported 205 deaths, equivalent to an annual rate of 17.0 per 1,000. Of the decedents 56 were under 5 years of age. Diphtheria caused 6 deaths, croup 1, measles 3, whooping-cough 2, scarlet fever 7, typhoid fever 2, malarial fever 2, diarrheal diseases 7, consumption 26

increase over the previous week; the former caused 43 deaths, and the latter 41. Diphtheria caused 26 deaths, small-pox 2, scarlet fever 3, whooping-cough 12, bronchitis 18, pneumonia 57, diarrhoeal diseases 53, and violence 37. Two cases of sporadic cholera were reported, neither of which resulted fatally. No death from dysentery has been reported for the past 4 weeks.

Rheims.—June 22-28. Deaths, 50; annual death-rate, 27.7. Diphtheria caused 1 death, consumption 5, acute lung diseases 6, diarrhoeal diseases 14, and violence 1.

Havre.—June 15-21. Deaths, 77; annual death-rate, 37.9 per 1,000. Measles caused 1 death, scarlet fever 3, croup 3, diphtheria 1, whooping-cough 1, bronchitis and pneumonia 10, consumption 13, diarrhoeal diseases 15, and violence 1.

Belgium—Brussels.—June 15-21. Deaths, 157; annual death-rate, 19.4 per 1,000. Small-pox caused 11 deaths, croup 6, whooping-cough 2, diarrhoeal diseases 17, bronchitis and pneumonia 17, consumption 19, and violence 5.

Austria—Vienna.—June 8-14. Deaths, 392; annual death-rate 26.8 per 1,000. Small-pox caused 4 deaths, measles 1, scarlet fever 2, diphtheria 2, diarrhoeal diseases 21, and acute lung diseases 63.

Russia—St. Petersburg.—June 8-14. Deaths, 575; annual death-rate, 32.2 per 1,000. Small-pox caused 4 deaths, measles 31, scarlet fever 11, typhoid fever 18, diphtheria 20, whooping-cough 2, diarrhoeal diseases 59, and acute lung diseases 87.

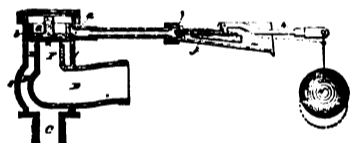
Denmark—Copenhagen.—June 17-24. Deaths, 119; annual death-rate, 23.2 per 1,000. Croup caused 3 deaths, whooping-cough 1, typhoid fever 1, diarrhoeal diseases 3, consumption 19, acute lung diseases 9, and violence 2.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

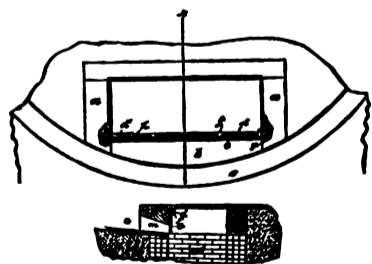
293,691. WATER-CLOSET VALVE. HENRY A. TOBBY, Dayton, O., assignor to the Hartford Sanitary Plumbing Company, Hartford, Conn. Filed July 30, 1883. (No model.) Issued March 25, 1884.



Claim. The herein-described valve, consisting of the chamber B, having an inlet, C, concentric therewith and below the outer passage, the outlet-passage from one side of the chamber, with a tubular extension therefrom into said chamber and concentric therewith, and so as to form a concentric space between the walls of said chamber and said tubular extension, with the valve G arranged to seat upon the open end of said concentric extension, and of an area substantially equal to the internal area of the chamber, but so as to leave a slight passage from that part of the chamber below to the part of the chamber above the valve, and an opening from that part of the chamber above the valve, with mechanism, substantially such as described, to open said passage above the valve for the escape of water therefrom, substantially as described.

293,828. SEWER-BASIN. WILLIAM SIEVERING, Newark, N. J. Filed June 29, 1883. (No model.) Issued March 25, 1884.

Brief.—The shutter in the mouth of the sewer-basin is mounted on an extensible pivotal bar.



Claim.—The combination, with the sewer-basin *m'*, having the mouth *m*, of the shutter *e* and extensible pivotal bar *d*, all arranged and operating substantially as and for the purposes set forth.

295,794. FAUCET-SCREW. MICHAEL O'CONNOR, New Brunswick, N. J. Filed January 19, 1884. (No model.) Issued March 25, 1884.



Claim.—1. The attaching-plate A, including in one piece the elevated chamber *b*, formed directly at the inner end of the screw-socket, and the valve-seat *k*, and having the nozzle and the threaded valve-stem and the

valve arranged to play in the socket and bear upon the seat of the attaching-plate, as and for the purpose described.

2. The attaching-plate A, adapted to be secured to a can, and including in one piece of sheet metal the screw-socket, and directly at its inner end the elevated chamber *b* and the valve-seat *k*, and having the nozzle B, said socket containing the screw-stem, having a thumb-piece at its outer end, and a valved inner end arranged to close over the chamber *b* and bear against the seat on the attaching-plate, substantially as shown and described.

294,749. CASE FOR OPERATING STOP-CKEYS FOR WATER AND GAS-PIPES. EVERETT L. ABBOTT, South Bend, Ind. Filed September 4, 1882. (No model.) Issued March 11, 1884.

294,781. DIVIDED SCREW-NUT. GEORGE S. HILTS, Batavia, N. Y. Filed December 31, 1883. (No model.) Issued March 11, 1884.

294,798. GAS-PRODUCING FURNACE. NELSON M. LANGDON, Chester N. J. Filed May 28, 1883. (No model.) Issued March 11, 1884.

294,808. MEANS FOR VENTILATING MINING-SHAFTS AND TUNNELS. WM. PHILLIPS, Coos Bay, Oreg. Filed October 18, 1882. (No model.) Issued March 11, 1884.

294,811. STOVE-PIPE THIMBLE. LUTHER RUSSELL, Evart, Mich. Filed July 6, 1883. (No model.) Issued March 11, 1884.

294,820. VENTILATION. MARSHALL B. STAFFORD, New York, N. Y. Filed November 2, 1882. (No model.) Issued March 11, 1884.

294,827. BARBED WIRE. ANDREW J. UPHAM, Sycamore, Ill., assignor to the Washburn & Moen Manufacturing Company, Worcester, Mass., and Isaac L. Elwood, DeKalb, Ill. Filed December 29, 1882. (No model.) Issued March 11, 1884.

294,848. FIRE-ESCAPE. ROBERT ALFRED BUSH, Brockville, Ontario, Canada. Filed May 8, 1883. (No model.) Issued March 11, 1884.

294,854. STEAM-RADIATOR. CHESTER COMSTOCK, New Canaan, Conn. Filed May 3, 1883. (No model.) Issued March 11, 1884.

294,857. CUT-OFF VALVE. ISAAC B. DAVIS and WILBUR L. SHEPARD, Hartford, Conn. Filed October 30, 1883. (No model.) Issued March 11, 1884.

294,859. APPARATUS FOR DRAINING MINES. GEORGE W. DICKIE, San Francisco, Cal., assignor to the Risdon Iron and Locomotive Works, same place. Filed December 23, 1882. (No model.) Issued March 11, 1884.

294,860. FIRE-ESCAPE. ELAM DYE, San Francisco, Cal. Filed April 2, 1883. (No model.) Issued March 11, 1884.

294,862. HYDROCARBON GAS-GENERATOR. JOSEPH FLANNERY, Philadelphia, Pa. Filed March 20, 1883. (No model.) Issued March 11, 1884.

294,868. CARBURETOR. ADOLF GAIRING and HENRY LEHMANN, Cleveland, O. Filed October 19, 1883. (No model.) Issued March 11, 1884.

294,867. SAND AND GRAVEL EXCAVATOR, SEPARATOR AND ASSORTER. NICHOLAS W. GODFREY, Northport, N. Y. Filed September 29, 1883. (No model.) Issued March 11, 1884.

294,871. SUPPORT FOR BOILERS. JOHN C. HAAG, Lansing, Mich. Filed October 6, 1883. (No model.) Issued March 11, 1884.

294,875. UPRIGHT TUBULAR BOILER. REMI HENRY and HIRAM B. TAYLOR, New Rochelle, N. Y. Filed January 3, 1884. (No model.) Issued March 11, 1884.

294,879. FIRE-ESCAPE. EZRA RANDALL JOHNSON, Buchanan, Mich. Filed November 19, 1883. (No model.) Issued March 11, 1884.

294,882. BED-SPRING FIRE-ESCAPE. MARY E. JONES, St. Paul, Minn. Filed April 2, 1883. (No model.) Issued March 11, 1884.

294,887. FIRE-ESCAPE. THEODORE P. LETTON, Parsons, Kan., assignor to himself and Emma M. Curtis, same place. Filed July 17, 1883. (No model.) Issued March 11, 1884.

294,908. FIRE-ESCAPE. EDUARD A. C. PETERSEN, Chicago, Ill. Filed November 5, 1883. (No model.) Issued March 11, 1884.

294,924. FURNACE FOR STEAM-BOILERS. JOHN B. SMITH and CHARLES A. PRESLER, Newark, N. J., and EDWARD FOX, Brooklyn, N. Y., assignors to themselves and Andrew Albright, Newark, N. J. Filed March 14, 1883. (No model.) Issued March 11, 1884.

294,927. STEAM-BOILER. JOS. STEVENS, San Francisco, Cal. Filed December 7, 1883. (No model.) Issued March 11, 1884.

294,987. HOSE-PATCH. GEORGE W. TOWLE, JR., San Rafael, Cal. Filed April 30, 1883. (No model.) Issued March 11, 1884.

294,945. STEAM COOKING APPARATUS. GEORGE W. WILLIAMS, Portis, Kan. Filed September 18, 1883. (No model.) Issued March 11, 1884.

294,951. STEAM-BOILER COVERING. HENRY F. ALLEN, New York, N. Y. Filed November 24, 1883. (No model.) Issued March 11, 1884.

294,977. COOLER OR REFRIGERATOR FOR ICE-MACHINES. WILLIAM EBERHARDT, Allegheny, Pa. Filed December 3, 1883. (No model.) Issued March 11, 1884.

294,992. APPARATUS FOR HEATING WATER, &c., FOR DOMESTIC AND OTHER PURPOSES. WATSON A. GOODYEAR, New Haven, Conn., assignor to one-half to Landon Ketchum, Saugatuck, Conn. Filed October 6, 1883. (No model.) Issued March 11, 1884.

294,982. METHOD OF AND APPARATUS FOR STEAM-HEATING. MARK S. FOOTE, Burlington, Ia. Filed June 30, 1883. (No model.) Issued March 11, 1884.

294,998. BOILER FURNACE. JOSEPH J. HALL, Chicago, Ill., assignor to Hall's Automatic Feed-Boiler Furnace Company, same place. Filed August 13, 1883. (No model.) Issued March 11, 1883.

295,088. WELL-BUCKET. FRED. E. MILLER, Lincoln, Neb. Filed October 2, 1882. Renewed January 19, 1884. (No model.) Issued March 11, 1884.

295,040. STEAM-RADIATOR. DOCTOR F. MORGAN and JOHN ROBB, Akron, O. Filed July 6, 1883. (No model.) Issued March 11, 1884.

295,045. WELL-DRILL. FRED. D. PARKER, Denver, Colorado. Filed November 2, 1883. (No model.) Issued March 11, 1884.

295,047. FIRE-ESCAPE. ROBERT B. PARROTT, Indianapolis, Iowa. Filed October 15, 1883. (No model.) Issued March 11, 1885.

295,145. COAL-DUST FEEDER. HENRY A. BRADLEY, New York, N. Y. Filed July 14, 1883. (No model.) Issued March 11, 1884.

295,151. HOSE-COUPPLING. JAMES CUMMINS, Janesville, Minn. Filed July 27, 1883. (No model.) Issued March 11, 1884.

295,168. VENTILATING SKYLIGHT. GEORGE HAYES, New York, N. Y. Filed July 17, 1883. (No model.) Issued March 11, 1884.

295,169. EVAPORATING APPARATUS. MARTIN PETER HAYES, Seaford, Ontario, Canada. Filed June 26, 1883. (No model.) Issued March 11, 1884.

295,188. FURNACE. CHARLES McMILLAN, Chicago, Ill. Filed October 25, 1882. (No model.) Issued March 11, 1884.

295,202. DREDGE. RUFUS E. ROSE, Kissimmee, Fla., assignor of three-fourths to Hamilton Disston, James M. Kreamer, and Samuel H. Grey, all of Philadelphia, Pa. Filed October 5, 1883. (No model.) Issued March 11, 1884.

295,208. FIRE-ESCAPE. MICHAEL SCHOLL, San Francisco, Cal. Filed December 19, 1883. (No model.) Issued March 11, 1884.

295,204. PIPE-WRENCH. FRANK A. SCHRAMM and AMBROSIOUS MODEBY, Philadelphia, Pa. Filed December 7, 1883. (No model.) Issued March 11, 1884.

295,205. PIPE-MOLDING APPARATUS. FREDERICK SHICKLE, St. Louis, Mo. Filed June 25, 1883. (No model.) Issued March 11, 1884.

295,212. FIRE-ESCAPE. CORNELIUS A. VAN WAGENEN, Ellenville, N. Y. Filed April 26, 1883. (No model.) Issued March 11, 1884.

295,221. FIRE-ESCAPE. BENJAMIN F. BENNETT, Lockport, N. Y. Filed April 9, 1883. (No model.) Issued March 11, 1884.

295,224. STEAM-TRAP. JAMES H. BLESSING, Albany, N. Y. Filed October 17, 1883. (No model.) Issued March 11, 1884.

295,227. PUNCH. EDWARD W. BRIGGS, Brooklyn, and JOHN D. WALTON, New York, N. Y. Filed March 30, 1883. (No model.) Issued March 11, 1884.

295,247. DITCHING AND GRADING MACHINE. ISAAC B. HAMMOND, Chicago, Ill. Filed December 28, 1882. (No model.) Issued March 11, 1884.

295,255. COUPPLING FOR CAR-HEATING APPARATUS. JOHN J. LACEY, San Francisco, assignor to the Lacey Automatic Coupling Company, Oakland, Cal. Filed February 24, 1883. Renewed February 13, 1884. (No model.) Issued March 11, 1884.

295,380. ROTARY ENGINE AND PUMP. RICHARD H. FROUDE, Kensington, county of Middlesex, England. Filed September 20, 1883. (No model.) Issued March 11, 1884.

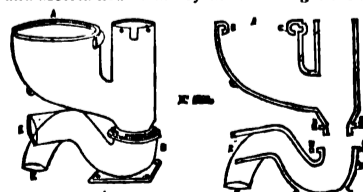
295,384. DEVICE FOR REGULATING TEMPERATURE. JAMES M. HALSTED, Oakland, Cal., assignor to Kate K. Halsted, same place. Filed August 29, 1883. (No model.) Issued March 11, 1884.

295,392. VAPOR AND GAS GENERATING FURNACE FOR LOCOMOTIVES, &c. HENRY F. HAYDEN, Washington, D. C., assignor to himself, John A. Logan, Illinois, and John T. Morgan, Alabama. Filed March 20, 1883. (No model.) Issued March 11, 1884.

295,413. WELL-DRILLING RIG. JAMES GILL-OTT MARTIN, Bradford, Pa. Filed July 9, 1883. (No model.) Issued March 11, 1884.

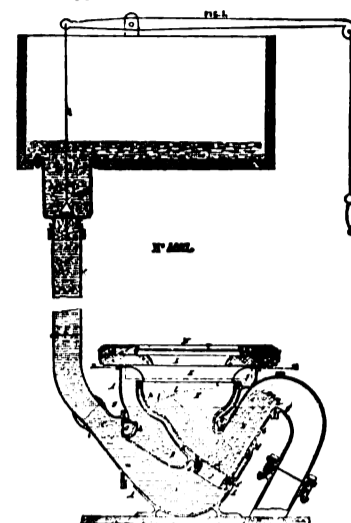
English Patents.

4,305. INVENTION FOR IMPROVEMENTS IN A WATER-CLOSET, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:



ABRAHAM EMANUEL, of 53, 55, and 57 Marylebone Lane, Oxford Street, London, W., in the county of Middlesex, sanitary engineer.
Com. spec. March 4, 1884.

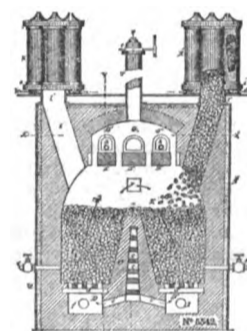
4,397. IMPROVEMENTS IN AND RELATING TO WATER-CLOSETS, AND APPARATUS FOR USE IN CONNECTION THEREWITH, AND FOR OTHER PURPOSES, which invention also comprises means for manufacturing parts of such apparatus. A communication from abroad.



This invention relates to water-closets, traps, valves and other apparatus for sanitary or similar purposes and comprises various improvements.

WILLIAM ROBERT LAKE, of the firm of Haseltine Lake & Co., Southampton Buildings, London. Letters patented October 2, 1883. (Price 12s.)

5,542. IMPROVEMENTS IN THE MANUFACTURE OF ILLUMINATING AND HEATING GAS AND IN APPARATUS THEREFOR. A communication from abroad.



This invention relates to the manufacture of illuminating and heating gas, first by the decomposition of steam in contact with incandescent or highly heated carbonaceous fuel; second, by the distillation of bituminous or soft coal in furnaces at a suitable temperature to preserve the resulting carbureted hydrogen-gas or hydrocarbon vapors from destructive decomposition, and produce hot-coke for decomposing steam; third, by the vaporization of liquid hydrocarbon, and fourth, by combining the gases, hydrogen and carbonic oxide, resulting from the decomposed steam, the gas from the coal and the gas and vapors from the hydrocarbon liquid, and converting them into a homogeneous fixed gas in a heated fixing-chamber.

ALFRED JULIUS BOULT, of 323 High Holborn, in the county of Middlesex, engineer. Complete spec. November 27, 1883. (Price 12s. 2d.)

Association News.

CHICAGO MASTER PLUMBERS.—At a regular meeting of the Chicago Master Plumbers' Association, July 16, Andrew Young in the chair, sixty members attended. Further gifts for the permanent exhibit of plumbers' supplies were reported from a number of parties, letters of encouragement being read from Fred. Adee & Co., New York, and the Andrew Nelson Mfg. Co., St. Louis. The election of standing committees was again deferred, and the higher officers were directed to nominate a list. Attention was called to a large drawing for the proposed plumbers' hall, and for his volunteered kindness Architect William Thomas was tendered thanks. "It shows that the architects do show some interest in the plumbers' associations; he will furnish all the plans free." Thanks were likewise given Bassett & Beaver for valuable gas-fixtures and to James W. Birkett, of Brooklyn, for a bound volume of the *Hydraulic and Sanitary Plumber*. Portraits of the late James Irons, Messrs. Hughes, Raffin, and other pioneer plumbers of Chicago, were reported almost in readiness to display on the walls. Then a surprise came to the meeting in an address, as follows, from Chairman Andrew Young: "Gentlemen—Having been elected to the Presidency of the National Association I would most respectfully tender my resignation as President of the Chicago Master Plumbers' Association. In doing so I will not relinquish any interest that I have taken heretofore, I can assure you. I shall be present at your meetings as faithful and attentive as I have ever been, and in any way, shape, or manner that I can further the interest of this association it

shall be done. I can assure you that I thank you kindly for the honors you have bestowed upon me in the past; I appreciate them to the fullest extent, and I know well that the Presidency of the National Association was only put over my shoulders as a compliment to this association. It is your work, the record you have made, that brought about that result. Thanking you kindly for your kindness to me in the past, I respectfully renew my resignation as President of the Chicago Association." Mr. Baggot moved that the resignation be not received. Mr. Wade, while begrudging no honors to Mr. Young, said that some kindness is cruelty; "he is placed in a position where he is receiving from twenty-five to thirty letters a day, and I don't believe in running a willing horse to death." Mr. Baggot: "I will withdraw my objection in justice to Mr. Young." Mr. Boyd: "I know we do appreciate what Mr. Young has done for us; he has led us so far successfully, and I hope you will appoint a successor who will still lead us on in the right and in harmony—the great success of the Chicago Master Plumbers' Association has been in harmony, you soldiers with the leaders. Mr. Roche nominated Mr. Baggot, and Mr. Wade seconded the nomination, as did Mr. Moylan. Mr. Moylan himself was placed in nomination, as also were Messrs. Griffith and Boyd. All three declined. Mr. Wade said he advanced the name of Mr. Baggot as an old resident, connected with the plumber's business for twenty-five years in this city, and one of the fraternity not only in Chicago, but all over the United States. "Let our standard be given to him in succession to our manly and honorable president who has just sent in his resignation." As tellers Vice-President Boyd named Messrs. McGraw and Murray, and the election of Edward Baggot was declared unanimous. Being escorted to the chair by Messrs. Rock and Wade, President Baggot said: "Gentlemen—This is a surprise to me, and I would much rather not have it. Indeed, if I had thought this thing was going to take place I would have staid away. Yet, I believe it is every member's duty to do what he can for the advancement of this association, particularly so after what I have seen that your delegates have done at Baltimore, and I believe if I hadn't been there with them I certainly would not take this office to-night. Now, you will have to be lenient with me in regard to the parliamentary ruling of the association, because I am not acquainted with it; it is an office that I have not occupied before in twenty-five years, and I have forgotten all about it in that time. Your retiring president and I used to run together—that is, the old machine; so I see after a quarter of a century we are coming together again, and I will try to do the very best I can for you." On suspension of the rules John Sullivan was elected a member. Messrs. Wade, Boyd, Sanders, Moylan, and Andrew Young were named a committee with reference to the incorporation of a Master Plumbers' Building Association. Treasurer Sanders reported receipts of \$958; paid out, \$638; balance, \$319.81; in hand now, \$475.62; and Financial Secretary McGinley had handled further moneys as follows: Received, \$670.86; paid out, \$651.85, and remitted to the treasury the \$25 salary provided by the constitution. The matter of some interlopers in Hyde Park was referred to the Warehouse Committee.

Notes.

CONSTRUCTION.

CHICAGO.—The Water Board has received bids for water-pipe as follows: Pray Manufacturing Company, \$9.95 per lineal foot for pipe, and 4½ cents per pound for rollers and plates; North Star Iron Works, \$9.97 for pipe, and 5½ cents for rollers and plates; Adams & Scholer, \$9.72 for pipe, and 3½ cents for rollers and plates. The bids were referred to the Committee on Construction. Bids for constructing the lining of the East Side Tunnel have also been opened as follows: C. L. Barry and Culbert, at \$6.15 per lineal foot; James Patterson, at \$4.95 per lineal foot; Tobin & Fallon, at \$3.94 per foot; C. W. Linehan and C. K. Leonard, at \$7.44 per foot; John Burns, at \$5.45 per foot.

PHILADELPHIA, PA.—Bids have been opened at the Highway Department for the erection of a temporary wooden bridge over the Schuylkill River, at Market Street, for use while the proposed new bridge across the river at that point is in process of construction, and three bids were received, from R. S. Malone & Son, at \$59,000; Herman, Clark & Co., at \$59,900, and Jones & Benner, at \$62,750.

REPRESENTATIVES of Eastern capitalists are in Detroit, Mich., seeking to effect the organization of a water-gas company.

STOCKBRIDGE, MASS.—An artesian-well is to be bored near the Stockbridge reservoir, the plan being to have the water run directly into the reservoir. Daniel Dull, who is boring the wells at North Adams, has the contract.

CLEVELAND, O.—On July 16 the Board of Water-Works trustees let the contract for constructing the foundation for the Fairmount Street reservoir pumping-station to David Robertson, for \$24,705.98. There were eleven bidders.

MARINE CITY, MICH.—Galvin Brothers, of Detroit, have secured the contracts for supplying the water-works of Marine City, Mich., and Elkhart, Ind., with compressed-wedge gate-valves.

JERSEY CITY, N. J.—Proposals will be received until July 28 for the construction of a sewer in Jefferson Avenue, as follows: 980 lineal feet of 24-inch sewer; two receiving-basins; 30 cubic yards of concrete; 625 cubic yards of rock excavation. Address the Board of Public Works, George T. Bouton, Clerk.

TOLEDO, O.—Stanley, Fisher & Co. completed the substructure of the Cherry Street bridge July 12, three days in advance of the contract time.

WESTPORT, CONN.—At a town meeting July 15, the plans and bid of the Central Bridge Works of Buffalo, N. Y., for a Pratt truss pin-connected wrought-iron bridge were accepted. Total length, 286 feet, with a draw of 144 feet; width, 20 feet in the clear; weight of bridge to be 220,000 pounds; cost, \$26,000. The selectmen signed a contract with Mr. Kitteridge for the bridge.

ROCHESTER, N. Y.—Extensions of water-mains to the value of \$9,900 have been directed by the aldermen to be made in certain streets.

PITTSBURG, PA.—Proposals for the erection of the court-house and jail, H. H. Richardson, architect, will be received until August 16 by the Controller, Josiah H. Speer. Bonds in the sum of \$500,000 will be required.

WATER-WORKS WANTED.—Proposals for building water-works for Frankfort, Ky., about 10,000 inhabitants, for private consumption and protection against fire, will be received until July 30. The works are to be constructed under the "pumping and pressure reservoir system." The supply of water is to be taken from the Kentucky River, which runs through said city, and the reservoir located upon one of the adjacent hills. Address, F. V. Gray, City Clerk.

THE PENN BRIDGE CO. at Beaver Falls has taken a contract for a highway bridge over the Beaver River, between Rochester and Bridge-water, Mass. The bridge will have one span of 160 feet and two of 200 feet each; there will be two wagon-ways twelve feet wide and a footwalk six feet wide. The contract price is \$25,000.

WATER-CONSERVATION IN SOUTH AUSTRALIA.—The South Australian Government is obtaining definite information with reference to a scheme propounded by Mr. G. Martin for the conservation of water in the hills in the neighborhood of Gawler, by throwing a large dam across the Para, so as to impound 6,000,000,000 gallons of water. The colonial hydraulic engineer, Mr. Mestayer, the conservator of water, Mr. Jones, and an engineer who has had extensive experience of water-conservation works, have paid a visit to the spot at which Mr. Martin suggests the water should be impounded; and the engineer has been set at work to make a thorough examination of the country by boring and otherwise, with a view of ascertaining the holding capacity of the ground, the best place in which to construct the dam, the probable cost, and the quantity of water which may be impounded. The impression seems to be that the scheme is perfectly feasible.—*Engineering*.

GOVERNMENT WORK.

CUSTOM-HOUSE AND POST-OFFICE, KANSAS CITY, MO.—Synopsis of bids for plastering, opened July 17, 1884: Charles W. Field, \$15,500; D. W. Lloyd, \$7,200; J. S. Lewis, \$9,500; Shepherd & Bays, \$8,899; William Harris, \$9,875; Smith & Crump, \$4,376; James Eastman, \$5,732.

CUSTOM-HOUSE AND POST-OFFICE, CINCINNATI, O.—Synopsis of bids for joiners' work and wood-flooring, opened July 8, 1884:

Time.	Wood flooring.	Time.	White pine and black walnut.	White pine and white oak.	White pine and mahogany.
4 months.	\$17,250.00	12 months.	\$12,500.00	\$37,254.00	\$44,039.00
"	"	"	39,382.70	37,058.40	42,587.65
"	"	"	17,080.00	34,926.99	41,076.35
No check.	"	5 months.	26,187.49	22,675.14	29,499.31
3 months.	\$23,861.81	Feb. 1, 1885.			

* Additional flooring, \$21.00 per sq. ft. † Additional flooring, \$14.00 per sq. ft. ‡ Additional flooring, \$13.85 per sq. ft.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
July 19.....	24.89	18.84	21.69	30.32	26.81	16.66

E. G. LOVE, Ph.D., Gas Examiner.

THE buildings of the International Electrical Exhibition at Philadelphia are now finished, and exhibitors have begun to make arrangements for placing their exhibits. The sections of the Board of Examiners are as follows: I. Dynamo-electric machines for lighting. II. Dynamo-electric machines for plating. III. Dynamo-electric machines for miscellaneous purposes. IV. Dynamo-electric motors and transmission of energy. V. Arc-lamps. VI. Carbons for arc-lamps. VII. Incandescent-lamps. VIII. Photometric measurements. IX. Dynamometrical measurements. X. Boilers. XI. Steam-engines. XII. Gas-engines and other prime motors. XIII. Apparatus for high electro-motive force. 1. Lightning protection. 2. Electrostatic induction machines and induction coils. 3. Igniters. XIV. Voltaic-electric apparatus. 1. Voltaic batteries and accessories. 2. Polarization and storage batteries. XV. Electro metallurgy. XVI. Thermo and magneto-electric apparatus. XVII. Electro-conductors. 1. Telegraph and telephone wires and cables. 2. Electric-light and power circuits. 3. Submarine cables. XVIII. Underground conduits. XIX. Electro-telegraphs. 1. Morse systems. 2. Printing telegraphs. 3. Duplex, quadruplex, multiplex, and harmonic systems. XX. Telephones, microphones, and radiophones. XXI. Fire and burglar-alarm and annunciators. XXII. Electro-signal and registering apparatus. XXIII. Electro-therapeutic apparatus. XXIV. Electro-dental apparatus. XXV. Applications of electricity to musical apparatus. XXVI. Applications of electricity to artistic effects and art productions. XXVII. Applications of electricity to warfare. XXVIII. Instruments of precision. XXIX. Educational apparatus.

THE Consumers' Gas Company, of Boston, has had a hearing on its petition to be allowed to open streets and lay gas-pipes. The company makes water-gas.

COLCHESTER, Eng., is said to be the first town in the United Kingdom to adopt the general use of the electric-light. The arrangements have been completed; many of the houses are already lighted with electricity.

THE MAGAZINES.

EACH number of *Harper's Magazine* seems, if possible to surpass the preceding ones in variety and interest, and that for August is no exception. Among the contributions to the current number may be mentioned the "Artist Strolls in Holland," by George H. Boughton, illustrated; an illustrated description of the picturesque islands in Boston Harbor, by William H. Rideing; an interesting illustrated article on Salt Lake City, by Ernest Ingersoll; a contribution by Dr. F. J. Nott, on the "Medical Virtues of Richfield Springs and other New York Sulphur Waters," for which a special analysis was made, and an article on the "Building of the Muscle," by Julian Hawthorne. Poems are presented from the pens of Lucy Larcom, Annie Fields, and Laura M. Marquand, and the reputation of the regular departments of the magazine is well sustained.

The August *Century* is an interesting and valuable literary production, not alone because of the wide variety, and timely importance of the topics treated, but also because of the artistic beauty of the illustrations. We find among the contents "A Glance at British Wild Flowers," handsomely illustrated; "An Historical Reminiscence of Gen. Sam. Houston," by Alex. Hynds; a continuation of Mrs. Schuyler Van Rensselaer's interesting papers on "Recent Architecture in America," well illustrated, the present chapter having special reference to commercial buildings; Isaac L. Rice contributes a valuable paper on "Work for a Constitutional Convention," and there is an article on Chinese Gordon, by W. T. Stead. We notice the opening chapters of two new stories, one by Henry James, entitled "A New England Winter," and the other by Hjalmar Hjorth Boyesen, "A Problematical Character." George W. Cable's novel, "Dr. Sevier," is continued. In addition to the usual amount of poetry and bric-a-brac, there are offered discussions on timely topics, such as "Republican Institutions and the Spoils System," "Business Gambling," "Legacies of the War," and "American Monumental Art." Under the heading, "Open Letters," we find, among others, Charles B. Spahr writing on "Young Alumni in Politics," W. D. Howells on "Two Notable Novels," and Charles Barnard on "Recent Inventions—Domestic Refrigeration."

The August *Manhattan* is a very readable and entertaining magazine. The leading article is a vivid description of the Yellowstone National Park, by Ashley W. Cole, with profuse illustrations. There is also reproductions of Delaroche's famous painting, "The Hemicycle," now in the Walters Gallery, at Baltimore, with an illustrated descriptive article, entitled "Paul Delaroche and His Pupils," by Ernest Knauff. The new Produce Exchange is criticised by Montgomery Schuyler. The article is well illustrated, one engraving showing the Exchange as it looks from the harbor. J. Leonard Cowing contributes an article on "Women Artists of the Olden Time." In addition to the continued chapters of "Retrospections of the American Stage" and the novel "Trajan," there are valuable papers by Lewis Rosenthal on the popularity of "Poe in Paris," and by Julian Hawthorne on "Emerson as an American." There is also the usual amount of short stories, poetry, and book notices.

WALTER H. THOMSON.

MR. THOMSON, Superintendent of the printing establishment of E. P. Coby & Co., on William Street, in this city, died on Sunday last, in the forty-third year of his age, of the consequences of a tumor in the back. He had suffered for the past year, undergoing repeated operations, until his strength failed, and death followed.

Mr. Thomson had been with the printing establishment of Messrs. Coby & Co. for about eight years. The first number of THE SANITARY ENGINEER was composed and printed under his immediate personal supervision, and for six years, until December, 1883, scarcely a number was printed which he had not the direction of.

Mr. Thomson was a thorough practical printer. His father came to this country from Scotland to take charge of the lithographic work of a New York house, when the art was comparatively new in this country, and the subject of this notice, who was born in New

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ENGINEERING PROGRESS.

IN the daily routine of life, surrounded and pressed upon by the petty details that must be attended to to keep our complex machinery in perfect running order, we feel at times as if the world was standing still, if not going backward. The ignorance of individuals, the obstinacy of corporations, the conservatism of committees are the most apparent and most keenly-felt obstacles in our present strivings, and predominate so excessively in the affairs which demand our immediate attention, that, looking only at the work accomplished day by day, there appears to be no advancement, and the calmly confident utterance of Galileo, "*E pur si muove*," seems like the empty boast of an enthusiast.

It is only when a retrospect of the occurrences of a considerable period is taken, and the condition of affairs at some past time and the present time compared, that we can fully appreciate the fact that the world is not standing still and that the labors of scientists are not in vain. The true scientist is not the man who secludes himself from the world and evolves theories out of his own little brain, regardless of the facts around him, but is the man who combines the study of principles with the observation of practice, and reaches his conclusions as much by induction as by deduction. The knowledge of what others have accomplished is as necessary for his progress as his researches are to theirs.

It is a judicious provision, therefore, in the regulations of most practically scientific associations, that there shall be annually, at a general meeting, a review of progress in their specialty made by the president, who is, or ought to be, a person peculiarly fitted for this task.

There are before us three addresses of this nature, made respectively by the presidents of the Institution of Civil Engineers in London, the American Society of Civil Engineers at their annual convention, and the Engineers' Club of Philadelphia. The scope of the profession which these societies embrace is so wide that a complete review of its achievements, even for one year, is not possible for one man in the limits of a single address, and in looking over these three summaries of engineering progress, one cannot but be struck with the variety of the topics treated in a summary manner and the different methods pursued in presenting them.

Sir J. W. Bazalgette, before the Institution of Civil Engineers, touched lightly on the general advance in engineering, and devoted his remarks "especially to those engineering works which promote the health and comfort of the inhabitants of large cities." London, of course, which "is now without a rival as regards its size and population, not only in the present, but, as far as we know, in the past history of the world," claims the largest share of his attention, and his summary of the public works of the metropolis is a marvelous condensation of valuable facts. Other large cities are described, and a most interesting and valuable collection of the statistics of municipal works in seventy-eight of the largest cities of the world is given in tabular form. The sanitary influences of the laying out of towns, the construction of their public works, the distribution of their population, and the management of their affairs, are discussed at no great length, but in a broad and suggestive manner, differing in this respect from Mr. D. J. Whittemore, who could not find anything to tell the

American Society of Civil Engineers on sanitary matters, except that a little city in New Hampshire had been sewered without providing for rain-water removal.

In relation to the great advances in railway construction, the steps taken toward uniformity in time standards, the importance of the conservation of our forests for the sake of water-supply and navigation interests, and collaterally the necessity for improvement in processes for the preservation of timber used in construction, the methods of testing cements and the consequent improvements in the manufactured article, the progress made in pavements, in the manufacture and tests of iron and steel, and the application of these metals to structural purposes, Mr. Whittemore presented a mass of facts and valuable thoughts which are well worthy the careful study of the engineers of this country.

On the subject of the application of electricity to engineering purposes, Mr. Whittemore is silent, confining himself to the suggestion that conducting wires ought to be put underground. The address of Mr. Henry G. Morris before the Engineers' Club of Philadelphia, treats the progress in electrical engineering more thoroughly, but the complaint he makes against the New York authorities for neglecting to order all wires underground before a practicable mode of doing it has been devised, might well have been omitted. As a *résumé* of general engineering progress, Mr. Morris' address is perhaps more complete in detail than either of the others. It mentions with considerable particularity the works which have recently been executed in canals, tunnels, bridges, railroads, steam-heating and naval construction.

All three of these addresses are highly interesting and instructive. They may profitably be read, not only by engineers, but also by every one interested in engineering works; and to all those, whether in or out of the profession, who labor under the delusion that any one can be a civil engineer by calling himself so, we particularly commend this passage from President Whittemore's address: "It cannot be assumed that knowledge acquired from practical observation, valuable as we know it to be, in any large degree supplies the place of either an established and perfected literature or mental education."

* * * Much of the past and present may be learned by such observation and by actual labor in the field. But the ideal engineer is one who knows far more than can be taught him by sight or manual experience. * * * He must know the past with all its noble examples and grand experiences, but he must also comprehend the future and be constantly prepared for its successive revelations and infinite possibilities." Not less forcible is this testimony of the distinguished President of the Institution of Civil Engineers: "Those who should seek to follow the profession in these days, without careful preparation, combined with sound practical experience in the mathematical and scientific principles which lie at the root of all engineering, and without a study of what has already been achieved by others, and of new discoveries as they are developed, would soon be left behind in the race in which they had embarked."

SANITARY SENSATIONALISM.

IN THE SANITARY ENGINEER for June 12, page 27, we commented briefly on the subject of disposal of the dead, and pointed out that the great

danger of the living from noxious effluvia or from contagion from the bodies of the dead occurs before, and not after, the interment of the latter. Our attention has just been called to an editorial in the *London Globe* of June 16, commenting upon some papers on disposal of the dead presented at one of the health conferences, which are being held in connection with the Kensington Sanitary Exhibition; and this editorial contains so much sensible advice that it should be brought to the attention of all sanitarians.

"The writer remarks that 'the airing of brand new schemes for the entire revolution of manners and customs is premature, while the problems affecting ordinary daily life remain unsolved,' and takes the ground that any radical reform in the disposal of the dead is a matter of very slight moment, and that the perils to which the living are exposed by the dead are due to breaches of the commonest rules of decency connected with the conditions in which life is carried on. He comments on the impracticability of the scheme proposed by Mr. Wynter Blyth, an abstract of which we give in another column, and remarks that the public must have been amused, the paper being as good as a romance. 'It is not because we bury our dead under tombstones in cemeteries and church-yards, that the poor keep corpses in sleeping-rooms and pauperize themselves in order to have a fine funeral. * * * And this being so, no sort of sympathy can be bestowed on vague, Laputa-like dreams, reaching thousands of years forward to find a limit, in order that visitors to the crotchet department of the Health Exhibition may have a fresh subject of entirely useless conversation.'"

While our friend of the *Globe* is perhaps a little too sweeping in his condemnation of new propositions, since every reform must have a beginning, and seem rather absurd to those who are naturally strongly conservative, it is nevertheless true that it is a dangerous thing for a sanitarian to attempt to attract public attention by being sensational, for in the long run he usually loses more than he gains.

Sober, sensible people, who consider his propositions from a practical and business point of view, are apt to conclude that a man who is pyrotechnical and skyrockety in one point is an unsafe guide everywhere.

The man who employs all the superlatives in the language to depict the evils connected with earth burial, or with corsets, or adulterated vinegar, or some other pet bugaboo, destroys confidence in his judgment, and when he comes to warn people of the real and great perils to health which surround them, his utterances receive little attention.

The sensational speaker or writer is, by the majority of people, supposed to be desirous of attracting attention to himself rather than to his subject. And, while such a supposition is unjust in some cases, it must be confessed that it satisfactorily accounts for the performances of several "sanitary reformers" that we are acquainted with on this side of the Atlantic.

SCIENCE IN TRADE.

In a recent number of *Nature* the editor discourses on "Science and Manufactures," urging the application of the scientific spirit to the things of common life, and that to maintain industrial supremacy there must be a close connection between practical construction and theoretical investigation.

The importance of scientific investigation in sanitary matters is a thing we have often had occasion to insist on, and is, in fact, the urgent need of the present day. This is well known and generally assented to by the public, and the fact that a general demand for it exists is sufficiently proved by the vast amount of pseudo-scientific literature which is being produced as the best means of advertising certain things and persons. The merits of certain baking-powders, disinfectants, water-closets, ventilating-cowls, etc., etc., are set forth by certificates of analyses

and tests given by Professor So-and-so, and the preparation of such certificates is becoming a rather lucrative profession. While many of these certificates and elaborate puffs in the shape of formal papers are prepared by men who are so entirely unacquainted with scientific methods that they betray their ignorance and the mercenary motives which actuate them in almost every sentence, there are a few who possess enough knowledge of chemistry and physics to avoid making gross blunders, and are yet not over-scrupulous in the use which they will make of their knowledge if a sufficient pecuniary consideration be presented.

It is true that such men are rare, for scientific training fosters the love of truth, and the amount of patient work which it demands is such as to have a strong tendency to secure the survival only of the fittest, which in this case means those who will make an honest and proper use of the knowledge they have obtained. Nevertheless, a man may be a scientific man and at the same time very shaky in his morals, and such men are very dangerous. There is comparatively little danger, however, from the professional certifiers, seeing that it has now come to be generally understood that such certificates convey really reliable information rather with regard to the character and pecuniary necessities of the men who make them than in regard to the articles to which they relate.

WHILE the movement is on foot for a new building for the United States Assay Office on Wall Street in this city, THE SANITARY ENGINEER wishes to call attention to the necessity for a chimney and aspirating-shaft, at least one hundred feet higher than the present chimney. When the present Assay Office building was put up, undoubtedly a chimney one hundred and forty feet or so high was sufficient to carry the sulphurous and other fumes far above the upper windows of the surrounding buildings; but now, when the wind is favorable, these fumes are carried to the windows of the Drexel building, the Mills, the Mutual Life, and other high buildings in that neighborhood. With a chimney sufficiently high, these fumes, even though they should be deflected downward, would be diffused sufficiently not to produce coughing in the most sensitive lungs.

FUND TO PAY THE LEGAL EXPENSES OF ARCHITECTS.

THE French architects, at their late congress, heard with applause of a project for creating a fund which will be available for the defense of the interests of architects. The entrance fee is proposed to be thirty francs and the annual subscription twelve francs. It often happens in France as in England that an architect suffers from clients and public bodies because he is unable or is afraid to undertake the risk of law expenses. In England there is the additional annoyance to him that his institute will take no recognition of his difficulties, however grievous they may be; but the French society is not likely to allow a member's rights to be sacrificed to the timidity of a few under the guise of dignity and the "interests of the profession in general." The funds of the proposed society will not be available unless the council can find, after investigation, that the case is one which demands their interference, and it is possible that the society may often be enabled to keep cases out of the courts. The members will have the satisfaction of feeling that in a difficulty they will be sustained by the influence of the society, which can be exercised in other ways besides advancing money for law costs.—*London Architect*.

SANITARY CONFERENCE.

DR. JOHN RAUCH, Secretary of the Illinois State Board of Health, has suggested that the National Sanitary Conference of representatives of State Boards of Health meet at Washington early in August, to secure concerted action by health authorities against the spread of epidemic diseases, especially cholera. The conference will meet August 7. Quarantine officers of all the principal Atlantic and Gulf ports, members of the Ontario, Can., Board of Health, and other medical authorities of the Dominion, as well as health officials of American cities and States, are expected to be present.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. IV.

(Continued from page 146.)

THE illustrations, Figs. 10 and 11, pages 193 and 195, are views at opposite sides of the laundry in the Marquand house.

The room is 21 feet square, with encaustic-tile floor, and the walls are of white-glazed tiles with encaustic border.

The wash-trays are of white porcelain, six in number, and in the position shown. The range is only for laundry purposes, and is furnished with two U-shaped water-backs, which surround the fire at three sides, each having a separate grate and fire, *a* being the position of the boiler-back, while at *b* there is a water-back especially provided for a hot-water circulating apparatus, to which are connected the pipes *b*¹ and *b*²; the particulars of the fittings will be given in a later issue in connection with a description of the "drying-room." At *c*, on the range, is a copper boiler of from 25 to 30 gallons capacity, for boiling clothes or warming extra quantities of water, which is furnished with a draw-cock at the end of the range.

The Croton water-pipe *m*, Fig. 10, under the floor, branches into the pipe *m* to the tubs, the pipe *j* to the cut-off D, and the pipe *e* to the boiler *d*, returning warmed from the boiler through the pipe *f*. The pipe *f* dips below the floor where it branches to the pipe *l*, Fig. 10, and the pipe *b*, Fig. 11, to supply the trays with warm water. In case of there being no fire in the laundry range, the valve *g* can be opened, when warm water will be admitted from the "Croton" range in the kitchen, passing through the pipe *h*. The pipe *h* is the warm Croton pipe from the kitchen boiler to the "cut-off" D, the pipe *i* being the warm tank-supply from the tank-boiler in the kitchen. The cold supply to the "cut-off" D is through the pipes *j* and *k*, *j* being the Croton and *k* the tank-supply. The pipes *s* and *t* are the hot and cold supply-pipes from the cut-off D to a bath-room over this part of the house, *s* being the return or circulation-pipe, which below E returns respectively to the Croton or tank-boiler. The star at the back of the wash-trays indicates where the pipe is plugged to separate the hot from the cold water, *m*¹ being the air-chamber of the cold-water pipe. At *r* over the range, and within the hood, is a register for taking the warm air from over the range. It connects with a flue parallel with the chimney-flue, the latter being depended on for warming and rarefying the air within it. The pipe *b*¹ is the pipe leading to the drying-room coil, *b*² being the return-pipe of the same.

In Fig. 11 the pipe *c* is the warm supply to the tubs, and *b* the cold supply. The pipe *c*¹ is the air-chamber of the warm pipe, *d*¹ performing the same duties for the cold supply; the stars showing where the pipes are plugged. The waste-pipes and trap *e* are of heavy lead, the air-vent *d* being brass.

Figure 12 is the detail of the support of the waste-pipe underneath the tubs. The pipe itself is heavy lead, and is represented in the figure by the letter *a*; *b* is a segment of 3-inch brass pipe, and *c* and *d* are smaller segments, but of longer radii. *c* and *d* are sweated together, and *e* is sweated to them; *f* is a piece of ordinary brass pipe one inch (nominally) in diameter, and *g* is a brass casting. It will be noticed that *g* is threaded, and that the pipe *f* screws into it, but that *e* is not threaded, being simply fitted into it. This is done to get a more satisfactory adjustment as to length, so that all of the pedestals would have equal bearings on the floor, and is accomplished by revolving the pipe *f* with a pair of tongs, the pipe simply revolving in *e*, but screwing in or out of *g* as the case may be. The brass pipes are all tinned, and the fittings plated. Other information may be obtained from a careful study of the pictures, which are very faithful representations.

(TO BE CONTINUED.)

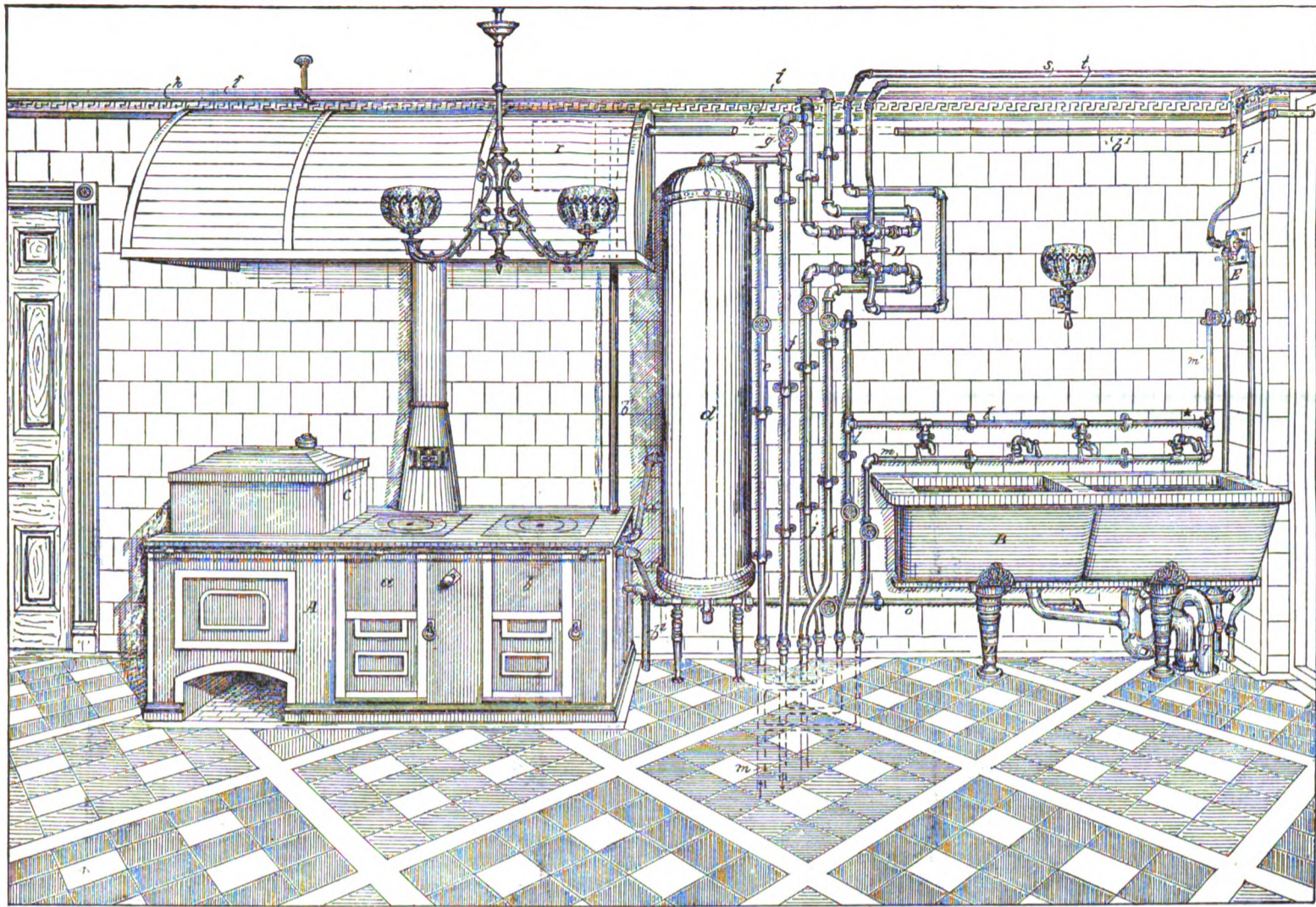


FIGURE 10.—LAUNDRY, RANGE, BOILER, AND WASH-TRAYS.

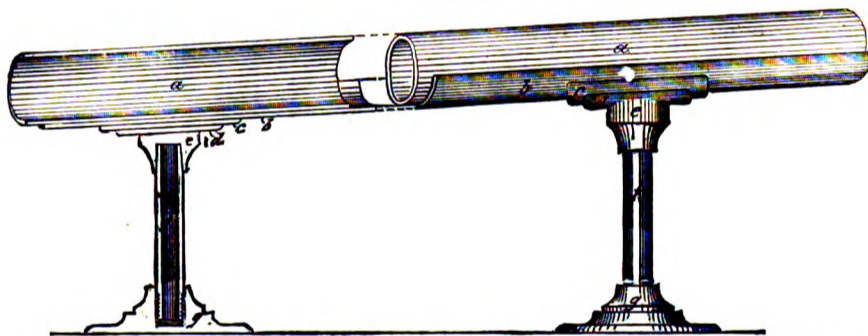


FIGURE 12.—DETAIL OF STANDARDS FOR SUPPORTING WASTE-PIPE.

NOTES.

FACILITIES FOR THE INDIRECT SPREAD OF CHOLERA.—In order rightly to appreciate what these facilities must be, the following considerations have to be borne in mind: First, that any choleraic discharge, cast without previous thorough disinfection into any cesspool or drain, or other depository or conduit of filth, infects the excremental matters with which it there mingles, and probably, more or less, the effluvia which those matters evolve; secondly, that the infective power of choleraic discharges attaches to whatever bedding, clothing, towels, and like things, have been imbued with them, and renders these things, if not thoroughly disinfected, as capable of spreading the disease in places to which they are sent (for washing or other purposes) as, in like circumstances, the patient himself would be; thirdly, that if, by leakage or soakage from cesspools or drains, or through reckless casting out of slops and wash-water, any taint (however small) of the infective material gets access to wells or other sources of drinking-water, it imparts to enormous volumes of water the power of propagating the disease. When due regard is had to these possibilities of indirect infection, there will be no difficulty in understanding that even a single case of cholera—perhaps of the slightest degree, and perhaps quite unsuspected in its neighborhood—may, if local circumstances co-operate, exert a terribly infective power on considerable masses of population.—*Memorandum of the Local Government Board of England.*

SIX men, while working in a Manchester, Eng., sewer were seriously affected by the poisonous air, and had to be removed to a hospital.

THE New York City Board of Health has adopted an ordinance forbidding the use of any tap, faucet, tank, fountain, or vessel, or any pipe or conduit in connection therewith, for storing beverages for drinking, which shall be composed of or made with brass, lead, copper, or other metal or metallic substance that is or will be affected by liquids so that dangerous, unwholesome, or deleterious compounds are formed therein or thereby, or such that beer, soda-water, syrups, or other liquid, or any other beverage, drink, or flavoring material drawn therefrom shall be unwholesome, dangerous, or detrimental to health.

THE State Board of Health of Illinois has sent a circular to railway companies doing business in the State, which requests them to aid in creating defenses against the spread of disease by putting their stations and depots in good sanitary condition. The water-closets and latrines and the water-supply should especially be looked after, and the roads should remedy, so far as they can, the formation of pools of stagnant water caused by their embankments.

THE new era of sanitation, inaugurated by the Public Health Acts of 1872 and 1875, is undoubtedly lengthening life in England; and there is every reason to hope that, whereas at present the lives saved are mainly those of children, we shall presently see a marked reduction in the death-rate of adults. What has already been achieved should only encourage those who are fighting a hard fight against general apathy in health matters to still greater exertions.—*British Medical Journal.*

REFUSE DISPOSAL AT BIRMINGHAM, ENG.

THE results of eight years' experience in the disposal of town refuse in Birmingham, England, are given in a late report of the Health Committee. The pail-system of collection and the disposal of the matter are described in THE SANITARY ENGINEER of September 1, 1881. The Health Committee took charge of the works in 1876. The system of treatment then was for the dry ashes to be formed into a sort of pound, into which the pan contents were emptied; the two were then mixed by spade labor. The process was very offensive. The dry refuse was screened by being thrown against sloping wire screens by hand labor.

The annual cost of the treatment was then \$175,805 for a population of 371,839, or forty-seven cents per head per annum. A series of experiments were made with machinery for drying and breaking up the material and making part into poudrette and consuming part, and the system adopted is substantially as follows:

The pans are emptied into tanks, where their contents are mixed with a certain proportion of sulphuric-acid, in order to fix the ammonia; a drying machine is then charged with the material thus prepared, the machine being a steam-jacketed cylinder, through which passes a hollow steam-heated spindle, fitted with arms which rotate, and thus keep the contents of the cylinder in a constant state of agitation. The vapor from the boiling mass is drawn off by a large blower, and passes into a Liebig's condenser, whence the condensed water flows into the sewer.

A muffle has been erected, which serves the double purpose of consuming rubbish and of heating air to pass into the dryers. The vapor from the dryers and the exhaust-steam from the engines pass through a large coil in the storage-tank, and when the machine is next charged the material is already partly dried, and does not, therefore, take so long to finish. The heat to work nearly all the machinery is raised by burning the rubbish from the ash-tub. The larger the drying machines the less time they take to dry a given quantity. The latest machines are double cylinders, united for about one-fourth of their circumference, with two revolving spindles so placed that their arms meet each other, more effectually breaking up the material than the single machines can, and thus dry it in a shorter time. The following table shows the size, contents, and average time occupied in drying the charge:

	Tons.	Hrs.
Firman's. .13'x4'6".	2.16,	or 1 ton in 8 hours.
Forrest's. .13'x6'6".	5.10,	" " 2 "
Farmer's Double.	16.24,	" " 1½ "

The net cost of the department for 1883 was \$165,076, for a population of 414,846, or 39.8 cents per head per annum.

At present, rather more than half the pan and tub contents of the town are treated as above described. For the rest, the dry refuse is screened; the fine ash is mixed with the pan contents and sold as manure. It is not worth to the farmer more than a price which leaves a loss of \$1.50 per ton to the committee. The rougher rubbish is boated on the canal to dumping grounds, which are getting filled up, and more ground will be difficult to obtain.

For the poudrette works, the return for the five weeks ending April 12, 1884, shows an output of 119.6 tons, or 13.9 tons per week, the sale of which realized a profit of 62 cents per ton of material treated, including interest on total capital expended and sinking fund. The machines at present in use, when all in full work, will treat about 240 tons of pan contents per week. The total quantity in the town is about 500 tons. The committee recommend the council to authorize the erection of plant to deal with the remainder of this quantity.

The machinery at present in use consists of two Forrest's dryers, four Farmer's dryers, twelve boilers, four furnaces, two muffles, and two mortar-mills. To make the plant adequate to deal with the whole requirements of the town, the following are needed: Five double dryers, eleven boilers, four muffles, two tanks, and buildings.

DRAINAGE COMMISSION.

UNDER authority of a law passed by the last Legislature, the Governor of Massachusetts has appointed a commission of five persons to "consider a general system of drainage for the relief of the valleys of the Mystic, Blackstone, and Charles Rivers, and certain other portions of the Commonwealth, and for the protection of the public water-supplies of the cities and towns situated within the basins of these rivers. This commission is expected to consider the various methods of disposal of sewage, and the application of such methods to any portion of the territory mentioned, and to report its conclusions in print to the Legislature of the year 1886, or to that of the year 1885, if practicable, for a portion or the whole of the territory, and to consider and report upon the needs of any other portion of the Commonwealth as to the disposal of sewage and the protection of the public water-supplies. It must also include in its report suitable maps and plans of the territory to be drained, an estimate of the cost of the work, and a recommendation as to the methods of apportioning the cost."

There are no experts on the commission, which is composed of two lawyers, a manufacturer, and two merchants. The expenses of the commission are limited to \$20,000, which will provide for the employment of expert investigators, if the commissioners themselves do not hold their own services at too high a figure. The field is a broad one and the work will require careful study and the exercise of great discretion. Massachusetts has made itself notorious for the thorough and skillful manner in which investigations of this character have heretofore been made, and the report of this commission will be awaited with interest.

DAMAGES FOR POLLUTION OF STREAM.

A CURIOUS case of recovery of damages from a coal company by a farmer occurred recently at St. Helens in Lancashire, England. The Rainford Coal and Iron Company in January last began washing their slack in a large trough and then turning the refuse into Rainford Brook, which flows through farms, the cattle of which are watered at it. The plaintiff's cow died shortly after, and four veterinary surgeons testified that death was due to the drinking of the water, which, being impregnated with coal, caused irritation of the bowels, with alternate constipation and diarrhoea. The jury found for the plaintiff for the value of the cow, and the cost of the veterinary surgeon for attendance prior to death.

PERSONAL.

DR. WILLIAM F. SHEEHAN, recently Health Officer of Rochester, died suddenly July 23. He was attending a patient at the time of the attack, which was declared to be apoplexy.

FRIENDS of Alexander Low, of this city, will be glad to learn that he is rapidly recovering from his late illness.

HEALTHY FOUNDATIONS.

No. X.

BY GLENN BROWN, ARCHITECT.

"He who builds a fair house upon an ill seat committeth himself to prison."—BACON, vol. i., page 49.
(Continued from page 147.)

Hollow Walls.—One of the simplest, and, at the same time, one of the most effective methods of protecting the interior of the building from dampness, is to build the foundation-walls hollow or with an air-space between them.

A hollow wall is, in fact, two walls built up separately, with an air-space not less than three inches wide between them.

When less than three inches, this space is liable to be clogged up by droppings of mortar from the wall above. Mr. E. S. Philbrick finds a 4-inch space necessary, and openings left at the bottom to clean out the droppings.

The two walls must be tied or bound together, to prevent a tendency they would have to spread out or double up from the weight of the wall above; for this purpose different forms of iron and brick ties are used.

The simplest iron tie is made by bending a wrought-iron bar a quarter of an inch thick two inches from each end (Fig. 36). When placed in the wall flat any water from the outside is liable to run along the top of the iron and into

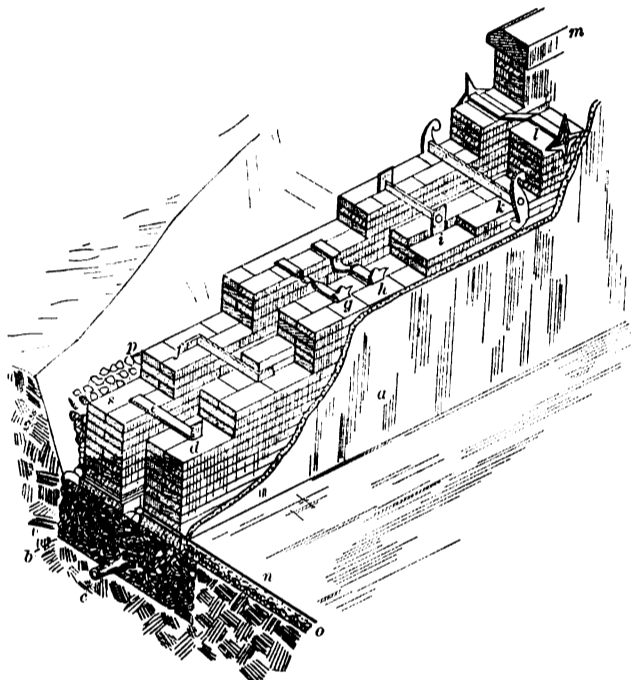


FIG. 36.—DIFFERENT IRON TIES.

a, Inside wall; d, outside wall; b, broken-stone footing; c, tile-drain; e, plain tie (flat); f, plain tie, on edge; g, twisted tie; h, V-shaped tie; i, plate ends; k, tie running through the wall; l, inclined tie; m, stone damp-proof course; n, asphalt coating and damp-proof course; o, concrete.

the inside wall. When the tie is placed on edge the possibility of water passing from one wall to the other is diminished by the difference between the breadth and thickness of the tie.

Different Iron Ties.—Iron ties are sometimes twisted or bent in the form of a U or V where they span the open space between the walls, so that any water from the outside would drop off in the hollow space between the walls.

Instead of simply bending the ends of the ties, plates may be bolted or riveted to them. In this way a larger surface of brick work is brought within the influence of the tie. The plates may be made ornamental where they show, either from necessity or design, on the outside of the wall.

To prevent the iron from being destroyed by oxidation, it must be coated with paint, red-lead being the best, pitch, asphalt, or zinc (galvanized). Pitched or galvanized ties are the most commonly used.

Ties treated by the Bower-Barff process would be well protected, but I am not familiar with the cost of this process (Fig. 36).

In ordinary cases ties should be put in every sixth course, and between two and three feet apart. Instead of placing the ties above each other in the different rows, they should be so placed as to bring the tie in one row midway between the ties in the rows above and below it. Where walls are to be subjected to the jarring effects of railroads or machinery, the number of ties should be increased, being put in every three or four courses, and every eighteen inches to two feet apart.

Brick Ties.—Common brick, and brick molded for the purpose, are used for tying hollow walls together. Even when common brick are coated with an impervious material, such as gas-tar, pitch or asphalt, and it is prevented from conveying water by capillary attraction, nevertheless water will pass along the surface from one wall to the other.

A brick adapted to the purpose was designed by Jennings, of England. These bricks are designed so as to project from the outside of one wall to the inside of the other, or so as to reach only within four inches of the face of each wall, and thus not to interfere with the bond on the outside.

The ends are wedge-shaped, which gives them a better hold on the wall, and they have holes in the centre through which the greater part of the water would trickle into the hollow space below (Fig. 37E).

The best brick tie was designed by the same party; it is so shaped that the inside is one or two courses higher than the outside end. By this form water is prevented from passing along the top of the brick. All such brick should be made from vitrified or glazed terra-cotta or stoneware.

The two walls composing a hollow wall may be of equal thickness, when it will give the most substantial foundation. The inside wall may be thicker than the outside when the smaller amount of brick-work will be exposed to dampness, or the thick wall may be built on the outside, with no

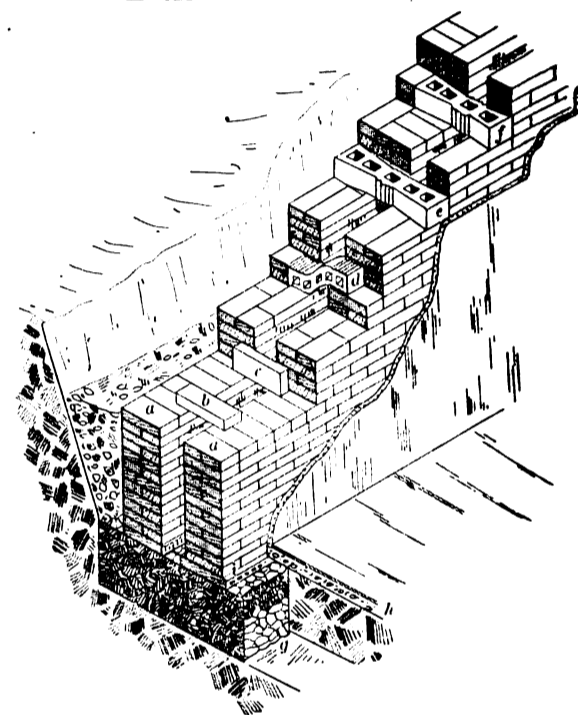


FIG. 37.—BRICK TIES.

a, Wall; b and c, common brick; d, curved brick; e, wedge-shaped brick with holes in centre; f, same, running only partly through the wall; g, footing; h, concrete damp-proof course.

advantage unless the whole lot is to be utilized in the building above the foundation.

Dwarf-Wall.—A hollow wall is sometimes made by building a small dwarf-wall three or four inches from the main wall, with bricks projecting at regular intervals and resting against the main wall. The projecting bricks on one side and the filling packed in on the other side gives the wall stability.

If the ends of the bricks which come in contact with the main wall are protected by an impervious coating in a wall of this kind, it will form an effectual barrier against dampness on the face of the wall where the ground comes in contact with it (Fig. 38).

(TO BE CONTINUED.)

THE Illinois State Board of Health has sent a circular to town Supervisors, requesting them to make an immediate inspection of all public buildings over which they have authority, especially alms-houses and jails, and to see that they are speedily put in as good sanitary condition as possible.

THE aggregate length of the streets of London is 1,966 miles, of which, excluding 248 miles in course of formation, 1,718 miles are thus maintained by various authorities namely: Macadam, 573 miles; granite, 280 miles; wood, 53 miles; asphalt, 13½ miles; flints or gravel, 798½ miles.

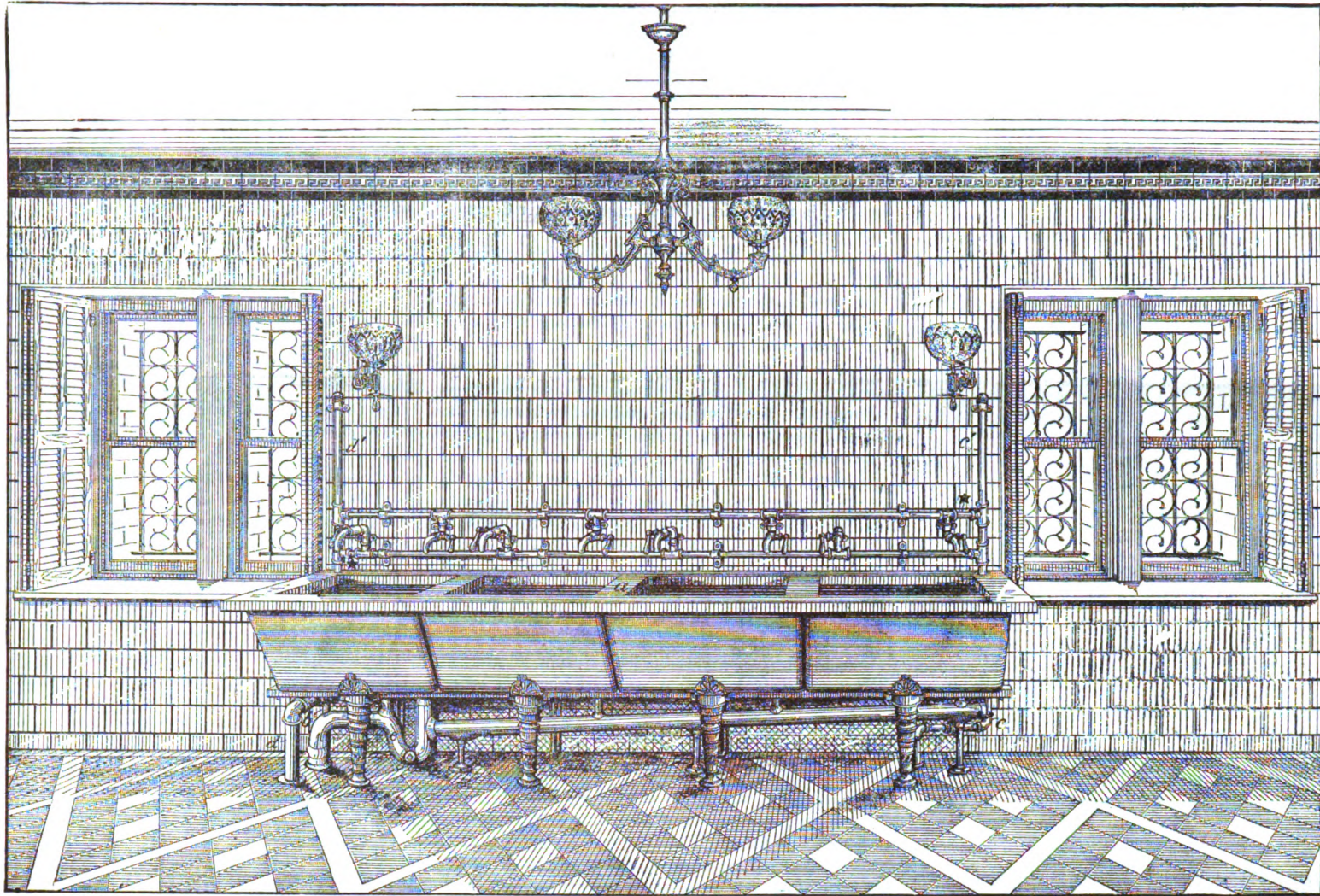


FIGURE II.—LAUNDRY TRAYS.

THE DISPOSAL OF THE DEAD.*

In this essay I must confine myself to the methods of dealing with human remains, those actually followed in civilized and uncivilized nations at the present time being pretty much as follows: 1. Simple exposure, so that, according to the climate, the body is wasted by the slow influence of the elements, or is consumed by insects, birds, or carrion-feeding animals. 2. Burial in the ground in all its varieties. 3. Burial in the sea. 4. Burial in fire—i.e., fire-burial or cremation. 5. Embalment, under which head may be included all kinds and methods of preservation. All the varied methods of disposal of the dead adopted by man are carried out by nature. Dead leaves, worms, insects, and animals, are covered up by dust, sand, and river-drift—*nature's burial*. In the Arctic regions, animal matters encased in ice are preserved indefinitely, and the fauna of prehistoric ages presented to our view unchanged—here see *nature's embalment*. Myriads of dead forms, both from the land and water, find their last resting-place in the ocean—*nature's deep-sea burial*. It must, however, be confessed that the most favored of all methods of disposal by nature is that of the consumption of a dead being by one that is living—the burial of the dead in the quick. Within a time so recent as to be within the memory of men but little past their prime, commissioners appointed to investigate intramural burial revealed sickening abuses relative to the disposal of the dead, and led to enactments which have had a most beneficial effect in preventing interment in the crowded graveyards of large cities. Some of the graveyards were owned by obscure and solitary owners, whose direct interest lay in burying as many as possible. For example, the Spafields burial-ground, in extent just about one acre, was originally a tea-garden, but the speculation having failed, it was turned into an unconsecrated burial-ground, and in fifty years the proprietor had received fees for the burial of 80,000 bodies. The evidence in this and similar cases showed that directly the ground was full, room was made for other bodies by breaking up and burning the coffins, and often partially cremating the remains. The ordinary method of inhumation in this country is to leave the body exposed

more or less to the air for a few days in a room or mortuary, to inclose it in a wooden box—this, among the rich, in a leaden shell—and then to bury in the ground. After death from infectious fevers, added to the ordinary emanations of putrefaction, there are those of an extremely dangerous character. The corpse after death from small-pox, typhus, and plague, has been known to be terribly infectious; and to a less extent after death from measles, scarlet fever, typhoid fever, and pneumonia. The infection may be conveyed by currents of air, or by actual contact with the body, or by the common household fly, or by domestic animals. In the houses of those classes which can afford to occupy a whole house, the body can be placed in a room by itself, and during the short interval preceding burial any offense to the senses or injury to health may be but transitory and under control. But among the poorer classes of great towns, especially among those who have to eat, sleep, live, multiply, and die in single rooms, the disposal of the dead presents a problem of considerable moment to the public health. If the poor would immediately consent to the removal of a corpse to a mortuary, there would be little difficulty; but naturally enough, the widow is loath to part with her dead husband, the mother from her child; and very unpleasant and distressing incidents result from this conserving of the body in living-rooms. If we continue to bury our dead, the best process would be to bury only one body in a grave at a minimum depth of six feet; to abolish the use of vaults; to allow no irremovable headstones or monuments over graves; and to cause at the end of a certain number of years reversion to agricultural purposes. At the end of five years from the last burial, the ground in any plot would be cultivated but not built upon. Some might be turned into plantations, some into pasture or arable land. In either case, beneath the waving corn, or the stately pines, the remains would be free from desecration; their exact site could be determined, by the aid of the permanent boundaries, with mathematical certainty; the earth would not be robbed of fertilizing material, and the acres and acres of cemetery ground which is now being continually withdrawn from its office as a food-producer would be utilized. The areas would remain for many years as open spaces; but should a quarter of a century elapse since the last burial, and some urgent public necessity arise for conversion of such an area to other than agricultural uses, then I see no objection to such conversion, provided

due notice be given of the fact, and relatives be permitted to remove the remains of their ancestors should they choose to do so. Nor do I see any reason why, after a sufficiently long period, such an area could not be again, if necessary, converted into a burial-ground. Other minor reformed systems of burial have been suggested. Thus it has been proposed to bury in charcoal—that is, to encase the corpse in this material. Experiments have shown decomposition goes on in the presence of charcoal almost without odor, and the proposal is sensible and scientific. Persons dying of virulent fevers are sometimes buried in quicklime; such a method has the advantage of absorbing both the liquid and most of the gaseous products of decay; it is also popularly supposed to destroy the body, but if examined its action is only superficial, the continued evolution of carbonic-acid gas soon turning the lime into the inert carbonate. Burial by encasing the confined body in disinfectants, or the placing of a deep layer of dry carbolic-acid powder or Sanitas powder over the coffin in the grave itself, are all attempts to make earth burial inoffensive to the living, and should be encouraged. Mr. Seymour Haden has advocated with great force inhumation without coffins; he would have the earth in direct contact with the corpse. There is no doubt whatever that if the burying-places possess a suitable soil, or if where the soil is unsuitable the ground be "made," such a method is generally far preferable to "confined" interments. A fine granular mold rich in carbon has extraordinary antiseptic properties, and if the grave be dug sufficiently deep, the corpse will not be preyed upon by the grosser forms of life. On the other hand, after death from infectious diseases, a coffin gives an opportunity of encasing the body with disinfectants and facilitates its removal, and in such instances the disuse of a coffin might not be free from danger. Mr. Haden's plan might also be found inapplicable to certain clayey grounds at present used as burying-places; such soils are apt to crack in dry weather and are only in a small degree antiseptic.

THE New York Sanitary Reform Society has called the attention of the New York State Board of Health to the rapid filling up of cemeteries near Long Island City. The Long Island Board of Health, to which the State Board referred the matter, replies that it has no jurisdiction and can do nothing, but recognizes the evil.

*Abstracted from a paper by A. Winter Blyth, Medical Officer of Health of Saint Marylebone, read before the Conference at the International Health Exhibition, June 14.

THE INTERNATIONAL HEALTH EXHIBITION. No. X.

(Continued from page 172.)

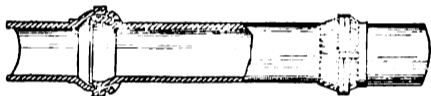
It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

THE LONDON WATER COMPANIES' EXHIBIT (CONTINUED).

THE Southwark and Vauxhall Water Company exhibits a number of sluice-valves. It also shows a box containing a figured section of its well sunk at Streatham, showing specimens of the strata passed through at different depths before reaching the chalk, these depths and strata being as follows:

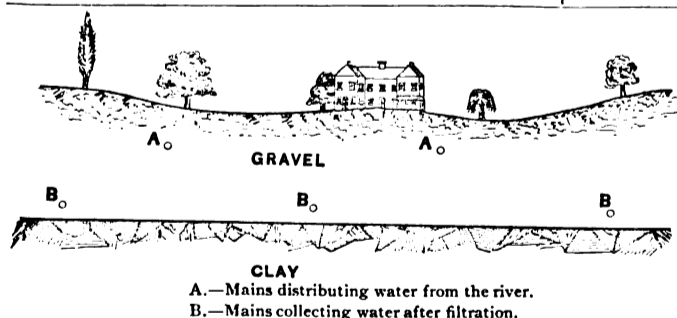
Depth from surface, ft.in.	Description of Strata.	Depth from surface, ft.in.	Description of Strata.
10 0	Gravel and marl.	171 0	Oyster shells.
16 0	Yellow clay.	173 6	Green sand.
78 0	Blue clay.	176 0	Mottled clay.
103 0	Blue clay and sand.	176 6	Conglomerate, shells, and quartz.
104 0	Claystones.	176 3	quartz.
126 0	Blue clay.	181 9	Clay shells and gray sand.
139 0	Blue clay and sand.	183 0	Sandy clay.
160 1	Pebbles.	184 6	Black clay and shells.
160 3	Pebbles and shells.	204 6	Mottled clay.
160 9	Conglomerate.	206 6	Claystones and green sand.
161 6	Black clay and shells.	211 0	Hard green sand.
162 0	Conglomerate.	211 6	Very hard sandstone.
163 0	Hard conglomerate.	224 9	Gray sand.
164 0	Black clay and shells.	227 3	Black sand.
164 3	Black clay and sand.	240 6	Gray sand.
167 9	Black clay and shells.	241 6	Flints.
169 6	Blue clay and shells.		Chalk.
169 9	Hard layer of shells.		

This company exhibits several drawings of different portions of its works. One of them illustrates the 30-inch cast-iron main which is laid across the bed of the River Thames between Richmond and Twickenham, the following sketch being a reproduction of a portion of the illustration:



The peculiarity of this main is that each joint has to be flexible, so as to conform to the uneven surface of the bed of the river, and consequently the joints are what are known as "ball and socket." An examination of the sketch will explain how this ingenious piece of engineering is effected. In the garden adjoining the Water Pavilion may be seen two or three lengths of this 30-inch main, showing the peculiar method of jointing them together.

Another drawing which is exhibited shows the system employed at the works at Hampton, on the River Thames, for the collection of water filtered naturally through the gravel soil adjoining the river. Nature has made here a large filter-bed by a bed of gravel, which superlies upon an impervious bed of clay. The following sketch will show a portion of a section of this natural filter-bed, and the means adopted for the distribution and collection of the water:



The company exhibits some very large pump-valves, one of them being a 60-inch dead-beat cast-iron delivery pump-valve, intended to be used with an engine fitted with a cylinder of 112 inches diameter and 10-foot stroke, and capable of delivering 820 gallons of water at each stroke. Near this large valve is exhibited a very beautiful and large working model of an ordinary single-acting Cornish beam-engine, a typical specimen of the engines in general use by this company.

THE LAMBETH WATER COMPANY.

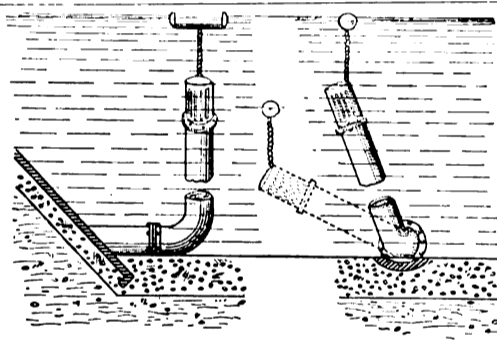
The most interesting exhibit of this company is that of a 4-inch Deacon waste-water meter at work. This is so fixed upon a pedestal that the cylinder and clockwork can be seen in action with the pencil marking the diagram.

Pressure-gauges are fixed on the outlet as well as the inlet mains of the meter, in order to show that there is no loss of pressure. Behind the meter are hung against the wall enlarged fac-similes of some diagrams taken with Deacon's meter, but this subject and the excellent methods for detection and prevention of waste under this system have been thoroughly explained in the pages of this journal already.

Near the meter is a large glass case containing specimens of defective house service-pipes and fittings, which were all discovered in the district of the Lambeth Water Company through the agency of the waste-water meter system. The contents of this case are very interesting, and are as follows:

Old wooden plugs, which it used to be the practice to drive into the dead-ends of mains on the intermittent system. These plugs soon got rotten or became displaced, and thus caused an enormous waste of water. It is scarcely necessary to add that when discovered wooden plugs were not replaced. Some old-fashioned water-closet spindle-valves are shown as being the fruitful source of much waste of water in dwelling-houses. Several specimens of lead house service-pipes are shown, some of them decayed by being laid in ashes, mortar, or bad soil, others damaged by the action of frost, the pickaxes of workmen, or broken by the pressure of a steam-roller or other heavy weight passing over them. An old iron main is also exhibited to show the former practice of inserting wooden plugs with iron clamps when a house-service was disconnected, instead of the modern blank ferrule. And last, but not least, are shown a number of specimens of bad plumbing-work, all executed within the last four years by so-called plumbers. Such work can only be seen to be believed, and a description of it is almost impossible. One example is that of a joint made on a severed lead pipe by means of splicing the ends together with tarred gaskin!

This company also shows drawings of several of its beam-engines and sections of its reservoirs, and also that of an ingenious arrangement for always obtaining the top water in a reservoir, at whatever level it may be, as will be seen by the following sketch taken from this drawing:



The Chelsea Water Company exhibits a number of old maps and diagrams of its works, dated 1810, etc., and a drawing of the aqueduct across the River Thames at Putney. This aqueduct was erected by it in 1854, but is now in course of demolition, in order to make way for another structure of more modern dimensions, the old one being found to be unequal to the present requirements.

It shows an interesting section of an old 6-inch lead service-main, said to have been laid for the supply of Hampton Court Palace by order of Cardinal Wolsey, and it also shows some statements and statistical tables of the lengths and sizes of the water-mains at present existing in the metropolis, from which it appears that there are no less than 4,332 miles of mains belonging to the eight companies, ranging in diameter from two inches up to thirty-six inches.

The Grand Junction Company exhibits a very fine collection of large photographs of different parts of its works, and especially of its filter-beds, showing them in course of being cleansed. This operation, as has already been mentioned, is one which entails a heavy and constantly recurring expense upon all the metropolitan companies except the Kent Company, which does not filter its water, which cleans nine acres of filter-bed surface every month during the year, and only possesses sixteen and a-half acres of filter-beds, while the total area of filter-beds of the remaining companies is nearly eighty acres. The process depicted on the photographs exhibited by the Grand Junction Company

is almost precisely the same method adopted by the others, and may be described as follows: A gang of men proceed on to the filter-bed after the water has been withdrawn, and scrape off the top coating of sand to a depth of about half an inch. The material thus removed is wheeled away in barrows to trolleys, which are hoisted by a steam-crane on to tram-rails laid all around the embankments surrounding the filter-beds. These trolleys are then drawn to the sand-washing machines, which consist of iron cylinders or boxes fitted with perforated false bottoms, resting in chambers of iron or brick walls, so constructed as to allow a space all around of about six inches. Water at a high pressure is then allowed to enter through the perforations of the false bottom, and the sand, while in a state of ebullition, is kept constantly stirred by men who stand around the machine. The water overflows the inner box into the outer casing, carrying with it the dirt and impurities contained in the sand, and from thence it flows into the nearest drain or other convenient receptacle. This process is continued until the clearness of the overflowing water shows that the sand is clean. The water is then shut off, the top coating of the sand in the machine is removed, and what remains is ready to be taken out and returned to the filter-bed. The washing takes from twenty minutes to half an hour to clean every cubic yard of sand, and it loses about 20 per cent. of its bulk in the process. In connection with this subject the company exhibits a model of one of its eight filter-beds at Kew, and a section of which was given in the earlier portions of these articles.

An interesting example is shown of an old method of carrying water through stoneware pipe-mains. These mains were constructed with stoneware pipes three feet in length. They had butt-joints which were surrounded by a thin iron hoop band about six inches wide, the whole being surrounded by a bunch of hydraulic-lime mortar, and from the specimen which is exhibited this method seems to have received a very sound joint as long as the line of main was perfectly straight.

The exhibits of various appliances by different makers will be elsewhere noticed. This concludes the notice of the water companies' attractive display.

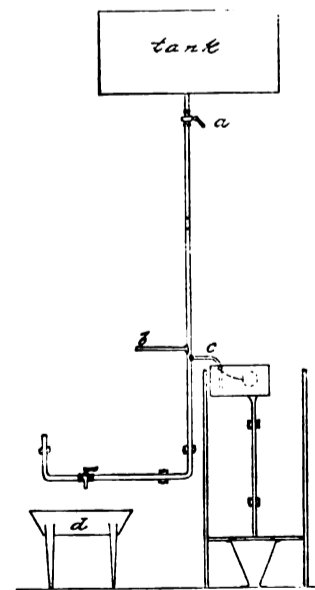
(To be continued.)

NOISE IN WATER-CLOSET TANK.

To the Editor of THE SANITARY ENGINEER:

DEAR SIR: Not a long time ago, if my memory serves me rightly, some one, through the columns of your paper, complained of a bubbling sound as of air in the waste-preventing cistern of a water-closet, and wanted to know how such could occur if it really was air; or, in other words, wanted to know how it could be possible for air to get into the water-pipes in such quantity as to give such an effect.

Lately the same thing occurred with me, and an investigation led to the following conclusion, which I will try to make plain with the aid of the diagram: In the top of the house there is a tank, as shown, which the janitor has to



keep full of water with a hand-pump. Finding that the water was wasted at some of the sinks in the house, causing much labor and pumping, the janitor closed the cock *a* until he found that it would take a certain number of hours to empty the tank, even if a sink-cock was left wide open. When one wants water at a sink it runs rapidly when the faucet is first opened, the quantity already in the pipes of the house

furnishing the supply; but should one want a large quantity, and draw for any considerable time, he will find the supply reduce to a mere dribble, when air will enter the system of piping. He closes the faucet, of course, when he leaves the sink, and it is this air which is forced out through the "hush" pipe, and, of course, under the water in the cistern, making the noise complained of, at least in our case. In any case of intermittent water-supply the same may follow.

Yours respectfully, E. S.

EVIL STATE OF A CITY.

COLUMBUS, O., July 24, 1884.—Columbus, like many of her sister cities, is sanitariously in bad condition; but, unlike many of them, seems really desirous of purifying herself, so far as the depleted condition of her treasury will admit. The first step taken was the appointment of an energetic health officer, with an active corps of sanitary inspectors. It is to be regretted, however, that they exercise but one of the senses. The most dangerous matter is not always of the vilest odor. Very much has been done toward the mitigation of stenches, but little or nothing toward the removal of causes or media of diseases. I have yet to learn of the closing of one of the ten thousand cesspools and wells with which the soil of the city is honeycombed, and there is practically no street-cleaning. Where the profuse sprinkling from hydrants does not leave mud, one is almost choked and blinded with dust, if but a gentle breeze be stirring.

A very little sewer-building is going on now. I wish for the future health of the people there was less, for but little regard appears to be given to future requirements. The sewers are now built, not always wisely, to meet current wants. The city is growing very rapidly; large manufacturing interests are centering here, but in none of the municipal work do these facts seem to have weight. The time is not very far off when the blunders now made and making will have to be remedied, and at serious cost. As illustrative of the character of their construction, I need only say they have drained a great many of the wells. Perhaps they been productive of good in that respect and are commendable, but they must also pollute the whole soil through which they pass.

The city owns and operates a Holly water-supply, but more than forty thousand people here take their entire domestic supply from wells of surface-water, with open privy-vaults or cesspools close by. There is no need of comment; the old nauseous story would be told. Many of these vaults (soakpools in reality) are nominally connected with the sewers, but actually with the surrounding earth by leaky joints, for, as a rule, the work is badly done. But good work or bad, there is nothing in the practice to be commended. There seems to be no city ordinance regulating this work—if there is, it is a "dead-letter."

Prof. Curtis Howard, of this city, is now engaged upon a series of analyses of the well-water. It is, perhaps, unfortunate that it is not done by direction of the Board of Health, rather than by the Trustees of the Water Board. It might seem to prejudiced minds that other motives than philanthropic ones prompted them.

ROVER.

UNDERGROUND CISTERNS.

A RAID has lately been made upon the underground cisterns which exist in certain districts of London, on the ground that it is possible for them to be fouled by contaminated surface-water, or by infiltration from neighboring drains. In Clerkenwell, a baker was recently summoned in respect of an underground cistern, which admittedly had not been cleaned out for two years. There can be no doubt that underground cisterns are liable to pollution in many ways, and that it would be a most unwise thing, in London at least, to rely upon them for the supply of potable water, inasmuch as the covers of these underground cisterns are rarely raised above the surface of the ground, and are generally faulty in regard of their cementing-rim round about the superior portion of the cistern-mouth. There is always a doubt, also, as to whether they leak or not, by reason of faulty ball-valves; and certainly they cannot be easily cleaned or flushed out, owing to their base being generally below the sewer, and only the overflow communicating with it in the ordinary shape of an overflow-pipe. One cannot wonder that the water companies are making use of the powers which they possess by act of Parliament for abolishing these underground cisterns, many of which are covered over by heavy stones, fitted inside by leaky ball-cocks, and sometimes in a very insanitary state. By all means let the water companies exercise their full powers in respect of these misplaced cisterns;

only they should act once and for all, and make, while so employed, a house-to-house visitation, and by this means, and by dint of suitable expostulations, make evident to their clients that a certain amount of danger is likely to result from water stored underground.—*British Medical Journal*.

THE MASTER PLUMBERS' NATIONAL ASSOCIATION.

MEETING OF THE EXECUTIVE COMMITTEE.

(Special correspondence of THE SANITARY ENGINEER.)

CHICAGO, July 24.—The Executive Committee of the Master Plumbers' Association of the United States met in this city, July 21-23, all the members present, namely: President Young, Vice-President Allison, Secretary Wade, Treasurer Graham, and Messrs. Murray, Sanders, Sheahan, Havey, and Moylan. By invitation, Mr. Boyd, State Vice-President, and Mr. Hamblin, Corresponding Secretary, were in attendance. The place of meeting was the Assembly Hall of the Chicago Master Plumbers' Association, and the first session opened at 5 o'clock Monday afternoon. After the disposal of preliminary business, Messrs. Wade and Murray were appointed a committee to ascertain the cost of the publication of the proceedings of the convention at Baltimore, and report at the morning session. The larger part of the evening was taken up in a discussion of the relation between the manufacturers and the retail dealers, called out by recent experience of the Louisville plumbers. Action was finally taken recommending that dealers recognize the claims of master plumbers' associations throughout the country in the matter of protection.

It was urged by Mr. Havey that the purposes and advantages of the National Association of Master Plumbers were not clearly understood by plumbers and dealers alike, and the results were doubt and misleading ideas. He thought steps should be taken to enlighten plumbers' associations throughout the country, by some authoritative statement emanating from the National Association through its Executive Committee. This proposal was heartily approved, and on motion of Mr. Graham, Mr. Havey was directed to submit a general letter giving the reasons for the existence of the National Association.

A letter from Mr. Birkett, President of the Brooklyn Association, asking for the appointment of a sub-committee of nine in New York and Brooklyn, to settle some misunderstandings pending in the East, was read, but no action was taken.

A resolution was presented by Mr. Allison, levying a per capita tax of \$2 on the local associations, and instructing the Financial Secretary to call in one-half of the amount to meet current expenses. This was amended by a resolution from Mr. Murray that the balance of the tax levied by the previous executive committee, amounting to \$1 for each member, be called in. The amendment was lost and the original resolution carried.

Mr. Allison moved that the Secretary be empowered to employ a clerk to assist him in his work. It was said that both Corresponding and Recording Secretaries needed assistance, and on motion of Mr. Sheahan, both secretaries were authorized to employ any assistance when necessary, with the consent of the President and subject to the approval of the Executive Committee.

On reassembling Friday morning, President Young in the chair, the Executive Committee held a consultation in regard to the interest of the trade throughout the country, and in the course of the morning a number of manufacturers of iron pipe were present. At the close of the interview President Young thanked the visitors for their presence and spirit of co-operation.

A lunch, provided through the hospitality of the President's wife and daughter-in-law, was consumed with appetites and libations of lemonade and wine and wit.

The third session commenced at 3 o'clock Tuesday afternoon after a very short intermission.

On motion of Mr. Murray, the Corresponding Secretary was instructed to write the State Vice-Presidents, and get names of members chosen by local associations as the Sanitary Committee, provided for by the Baltimore Convention.

Then the following committees were appointed by President Young, he calling freely for nominations by his *confrères*, and premising that Chicago, St. Louis, and Cincinnati, by reason of their voice on the Executive Committee, would becomingly be silent on the special committees:

Legislative Committee—Messrs. Hanna, Thorne, Bride, Reagan, and Fritz, all of Washington.

Apprentice Committee—William McCoach, William Harkness, Jr., and Mr. Coffin, all of Philadelphia.

Conference Committee—James Tucker, James F. Davlin, and John H. Stevens, all of Boston.

Essay Committee—George Cummins, James McNulty, Samuel Bowles, and T. J. Byrne, all of New York.

The paper provided for at the opening session was then read by Mr. Havey, approved and ordered distributed in pamphlet form as an address to the trade from the Executive Committee. It is as follows:

"DEAR SIR—We, the Executive Committee of the National Association of the Master Plumbers of the United States, feel, in the performance of the duty allotted to and the task assigned us by our honorable order, constrained to address to you a few earnest words in behalf of the cause we represent and desire to maintain to the end, and for the purpose of stimulating and encouraging you to renewed exertions, if you are now with us; if not, respectfully requesting the pleasure of your company at your earliest convenience, enabling us by your favorable action at the first practicable moment to be ultimately able to say that any action we may take for the advancement of the material, moral, or educational interests of our trade will receive the hearty and effective co-operation of every one engaged in it. We can only in the brief space here occupied give you a faint conception of the work already done, or a bare outline of the purposes, having a probability of future accomplishment, but we doubt not that the judgment, intelligence, and perception which you possess, and which is part and parcel of the equipment for the avocation which you pursue, will render it an easy matter for you to elaborate upon the points given herein, and to form a good idea of what time has in store for us. We are now entering as a National Association upon the second year of our existence, with an enlarged membership and increased energy. We now command a hearing and respectful attention in all the large centres of trade in the country. We will not rest satisfied until the smallest centre a plumber strikes does likewise. Our material interests have been rescued from the deplorable condition into which they had gradually drifted prior to the formation of our association, and are now not only in a convalescent, but in some respects a decidedly healthy state, due solely to the united front presented to the drag-nets of manufacturers and jobbers in our lines of trade. We hope soon to be able to report the complete cure of the malady which has afflicted us, and doubt not but the cessation of the violent exercise indulged in by the men with the drag-nets will be conducive to their health and longevity of their being, as well as of our own. As to our moral and educational gain, we will say with regard to the first, it has always been good, and has now reached about perfection. As to the other, we will, upon application, furnish you with abundant evidence of our progress and proficiency, in the shape of addresses and essays made and delivered by members of our organization upon topics of moment and value, not only to ourselves, but all civilized society. In view, then, of this short presentation of the subject and of the benefit to be derived, we believe that you will not fail to give your continued or acquired support to the good cause we all hold dear, and enter eagerly and at once upon the progressive march which we will not halt until we reach that elevated plane which our abilities and profession entitle us to command."

Mr. Allison called attention to the timely card of President Young, the other day, in the associated press, and said it would be at once a fitting indorsement of the same, and a new proof of the committee's desire to aid in practical sanitary affairs, if they should look forward to representation at the National Conference, to be held in Washington August 5 and 6, with reference to the cholera. The idea was heartily adopted, and Mr. Allison, as a committee of one, was delegated, either by personal attendance or by correspondence, in his discretion, to carry it out.

Mr. Murray suggested Congressional aid in behalf of a more systematic and comprehensive sanitary code, covering the whole country.

The Chair said that if Congress could appropriate \$200,000 annually to fight foot-rot in sheep or pneumonia in the ox, this suggestion seemed in order. There was warrant for it in the Bureau of Animal Industry. Not that he underrated health measures already taken by the National Government, but let a pre-eminently practical bureau of a special scope also be constituted, making a canvass in each State, looking over the sanitary status in each section, the sewerage and the water-supply of centres of population. Should an epidemic attack any village or town in the country, an expert would go there and report to the Chief at

Washington. This and other reports of the like kind from other officers when compiled and digested at the end of the year would make an extensive sanitary report, such as we have never had before, with great resulting benefit to the community at large.

Vice-President Allison—I move that the President of the National Association be constituted a committee of one on the subject, and empowered to act at his discretion.

Mr. Havey put the motion, and it was carried unanimously.

Mr. Allison (with not distant reference to Cincinnati)—What do you think of a city with a Board of Health numbering five saloon-keepers and one physician?

President Young—I don't wonder that the powers above were tempted to destroy it by another flood.

Mr. Allison—We're ready for cholera, or anything else that comes along.

As to Chicago, the statement was concurred in that the city possessed an excellent health officer, though sadly crippled in having only one plumber on his staff. In this city the Master Plumbers' Association was zealously enlisted in aid of all sanitary improvement, and its co-operation had been as welcomed as if it had been given at much pecuniary cost. "The sanitary press has led in the good work and deserves all credit, and the daily press, in Chicago at least, is not far off."

Mr. Graham bewailed the St. Louis situation, where he could start out one man from his shop, who could take the place and outdo the efforts of the ten alleged health inspectors of that city.

Mr. Murray was made a committee of one on certain needed State legislation.

Messrs. Sheahan and Havey were deputed to visit the pipe men present in the morning, and report to the committee.

The evening session, Tuesday, opened at 8 o'clock. Messrs. Wade and Moylan were appointed to compile and publish the report of the Baltimore convention, and Messrs. Sheahan and Graham on appropriate minutes regarding retiring officers. It was voted that electrotypes of essays be retained, and recommended that local associations make use of them, at the same time publishing their members' names on the backs of pamphlets. Messrs. Young and Graham were asked to draw up a form showing how local associations could be organized. Adjourned.

At 10 o'clock Wednesday morning the closing session began, and after minor business the Executive Committee gave audience to representative lead manufacturers, with the happiest results. Likewise the committee on visiting the iron-pipe men submitted a report that was satisfactory in the highest. It was recommended that each local association send a representative to the meeting at St. Louis in October of the American Public Health Association, and it was determined to hold the next session of the Executive Committee at St. Louis, at that time. The following resolution, presented by Mr. Allison, was then adopted:

WHEREAS, The alarming spread of the cholera epidemic has created a wide-spread feeling of dread of its being transferred to our own country, and in anticipation of its appearance it behooves every good citizen to exert his influence and power in checking its approach, and exercising all diligence and care; therefore, be it

Resolved, That the Master Plumbers' Associations of the United States of America, recognizing the importance of the above facts, do hereby indorse the action of the President of the United States in his timely action in the appointment of a board of sanitary experts, and, as practical men, will lend every effort in our power to act in any auxiliary capacity where our services can be made useful and practical.

Final adjournment soon followed, whereupon, after dinner, the visiting committeemen were confirmed in their agreeable impressions of Chicago and the Chicago majority in their body, by a drive on the boulevards and through the parks, and in the evening by a social reception.

BUILDERS AND UNION-MEN IN BUFFALO, N. Y.

THE Buffalo Builders' Association has adopted the following resolutions:

WHEREAS, The Bricklayers' and Stone-Masons' Union, on or about the 22d day of May, ordered their members to strike for an advance of fifty cents per day; and

WHEREAS, We have been informed that the said strike was ordered in a fraudulent manner by recording all members absent as voting for the strike; and

WHEREAS, We believe that there are many men belonging to the Union who would be glad to go to work at the old rate—\$3.00 a day—if they were sure that they would not be persecuted by the Union; therefore,

Resolved, That the members of this association hereby declare that they will employ none but non-Union men.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

NEW METHOD OF HEATING TWO BOILERS BY ONE WATER-BACK.

WE present to our readers, in the accompanying illustration, a new method of warming two boilers from a single water-back, each boiler being under a different pressure.

The arrangement has been devised to overcome the objection to and necessity for two water-backs in the same range, where water from a tank or cistern at the top of a house must be warmed to supply the upper stories, while water for kitchen and laundry purposes and the lower stories is obtained directly from the street supply in the usual manner.

The contrivance consists essentially of the high-pressure or "tank" boiler A, the low-pressure or "Croton" boiler B, and, in the absence of any other name, what may be called the "heater," C; with, of course, a water-back of ample dimensions in the range.

There are three distinct circulations: 1st. The warm water flowing from the back (which, in this case, is the low-pressure) passes through the pipe *c* to the heater C, returning through the pipe *c'*; 2d. The warm water in the outside chamber (*g*) of the heater C, passing through the pipe *d* into the boiler B, and returning to the heater through the pipe *d'*; 3d. The water from the inner chamber or tubes (*f*) of the heater C passing through the pipe *e* into the boiler A, and returning to the inner chamber again through the pipe *e'*.

It will be seen by this that the first and second circulations are low-pressure, and that the third is high or tank-pressure; but not so of necessity, as the tank-pressure may be used in the water-back, heater, and boiler B, transposing the order of the boilers; but the arrangement shown is, in the opinion of the inventor, the best, as by this order the tank may become empty by neglect or otherwise without danger to either boilers, or the tank-water may be shut off without drawing the fire.

The heater is seven inches in diameter by 14 inches long, outside measurement, and is made of copper. The inner part (*f*) is a tubular heater, with connecting chambers at the ends. The water of the outer chamber is around and between the tubes, and imparts its heat to the water within the tubes. The tubes are three-quarters of an inch in diameter by ten inches long, and thirteen in number, and have been found by experiment to give equal temperatures to both boilers.

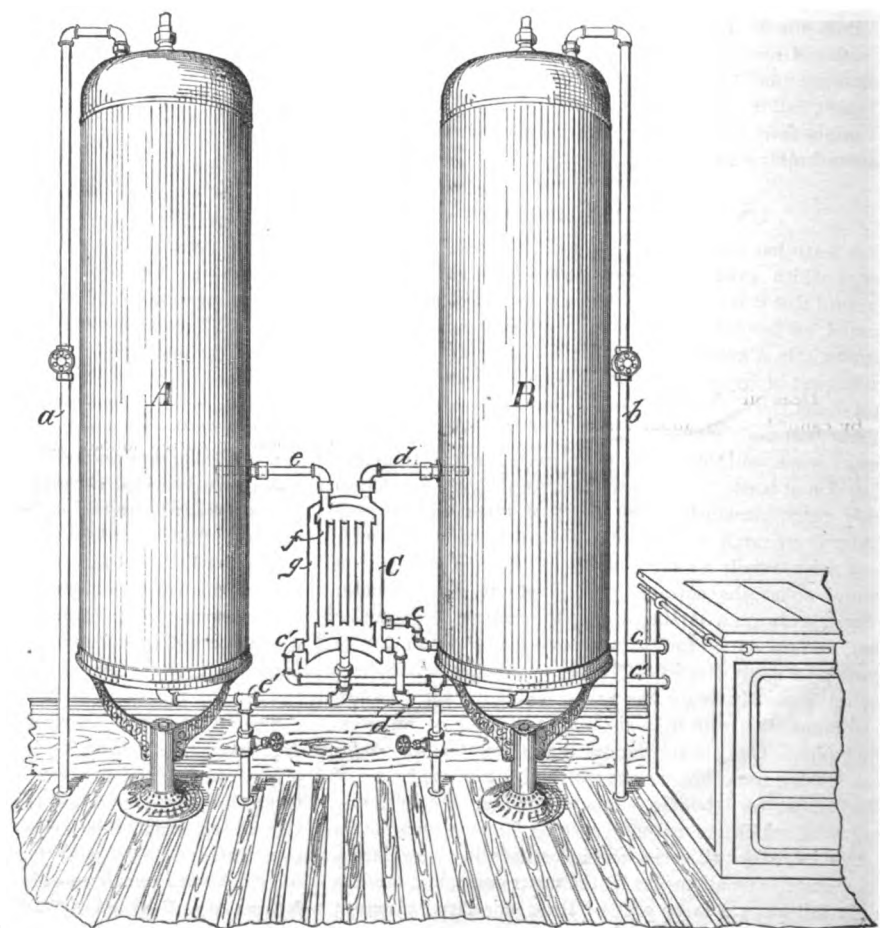
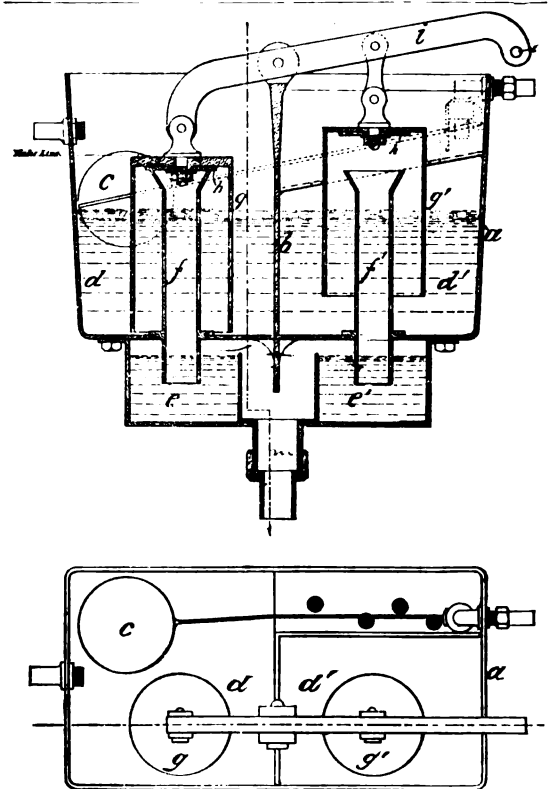
How much less surface in the inner part of the heater would give good results the inventor does not know, but he points out the fact that an excess of surface can have no other effect than to maintain an equable temperature between the boilers. He also points out that should the fire go down, leaving both boilers full of pretty hot water, and should the warm water in any one boiler be drawn away, exchanges of heat by circulation still go on between the boilers and

the heater, warming the cold boiler, and, of course, cooling the warm one, but, nevertheless, giving a greater quantity of warm water from the boiler drawn on than could be gotten if it connected directly with its own water-back.

The inventor is Mr. John Tucker, master-mechanic for Thomas J. Byrne, of 253 Fourth Avenue, New York, who is introducing the principle into one or two residences, a report of whose actual working will be given in due time.

FLUSHING-CISTERN.

THE fore and after flushing-apparatus for water-closets, shown in our illustration, consists essentially of a tank or cistern *a*, divided into two compartments *d* and *d'*, by the partition *b*, and of the lower chambers *e* and *e'*, the pipes *f* and *f'*, and the annular caps or bells *g* and *g'*, which are connected with the tilting-lever *i*, the fulcrum being midway between the caps. These caps, with the pipes *f*, form in each division annular syphons, whose operation in connection with the tilting-lever is as follows:



Assume the upper compartment *d*, containing the lowered cap *g*, to be charged with water. If now the lever *i* be operated so as to raise the cap *g* and to lower the other *g'*, until the valve *h* of the latter closes the pipe *f'*, then a partial vacuum will be created within the other pipe *f* covered by the cap *g*, which is now in the raised position, so that water from the chamber *d* will flow through the said pipe into the chamber *e* beneath and away by the pipe *m* to the closet or other place to be flushed. On releasing the lever *i* the valve that was raised will be caused to descend and close its pipe *f*, and the other valve *h* will be caused to ascend, as indicated, to the right, and water to descend the corresponding pipe *f'*, thus giving the after-flush.

The inventor is David Grey Cameron, Palace Road, Lambeth, county of Surry, England.

TRICHINOSIS IN NEW YORK STATE.

THE New York State Board of Health has made public the results of its investigations into the cases of trichinosis at Arietta in this State. The board received information of the outbreak early in July, and commissioned Dr. Eugene Beach, Inspector of the District, to investigate. The microscopic examination of muscles from a patient who had died was made by Dr. William Hailes, of the Albany Medical College.

Dr. Beach states that twelve persons in all were affected and two died—all either members of or boarders with the family of Oliver Bouville. All had eaten of the same raw ham at about the same time. The physician in attendance, being in doubt about the disease, called Dr. Beach's attention to it on July 2, and on the following day Dr. Beach visited the patients, one of whom died about twelve hours after his arrival. Pieces of the muscle of this patient were obtained by Dr. Beach three days after death and sent to the board. The microscopic examination by Professor Hailes showed trichinæ in great abundance, 3,000 to the cubic inch. "Some of the worms observed were already inclosed with a transparent cyst, while many were only partially rolled up or coiled upon themselves, others were free in the tissues. The muscular tissue examined was from the extremities. From the above facts we are justified in concluding that it is an unmistakable case of marked trichinosis of recent origin."

The report contains remarks on precautions to be taken, of which we quote the following:

Meat should not be eaten raw, or in a partially-cooked condition.

Thorough cooking is an efficient means of killing trichinæ. Large masses of meat (such as ham) require several hours continuous cooking. A medium-sized ham boiled for thirty minutes reaches a temperature of a little above 100 degrees Fahr. It requires 140 degrees Fahr. to positively kill the parasite. In the case of chops, steaks, and other small portions a much shorter time will suffice. A thorough broil of a few minutes will effectually destroy the life of the trichinæ. Ordinary salting and smoking does not destroy the parasite.

Prevent hogs from feeding upon raw offal and excrement, and avoid using the offal, etc., of animals subject to trichinosis as a fertilizer.

The thorough destruction of all offal, excrement, etc., so that vermin (rats, etc.) may not devour it and become the carriers of this dread malady.

NOT THE CAN.

DR. CHARLES STOVER, Health Officer of Amsterdam, N. Y., sends us the following note in reference to reports which have appeared in the daily press about a supposed case of poisoning from eating canned meats:

"AMSTERDAM, N. Y., July 23, 1884.

"Dear Sir—In regard to the alleged cases of poisoning by canned meats, about which frequent inquiries have been made recently, it appears from the investigation by the Board of Health of Amsterdam, that the sickness of Miss Alice Clark, Miss Belle Simpson, and Mrs. Mary A. Simpson of Amsterdam, and some residents of Port Jackson, a village opposite to and across the Mohawk from Amsterdam, was caused by the eating of corned beef prepared by a butcher of Port Jackson. There being in stock an excess of corned beef, this was put into brine in which was salt-petre, and prepared for being pressed into cakes somewhat like head-cheese. This operation was effected in a boiler with a copper bottom. The family in Port Jackson purchased some of the meat and sent a portion to the Simpson family at Amsterdam. Dr. F. O. Cornell, of Port Jackson, and Dr. E. T. Ralison, of Amsterdam, were the medical attendants, and both diagnosed cases of poisoning. The former, upon chemical examination, discovered copper in the meat. Other families are said to have eaten of the meat with no ill results following.

CHARLES STOVER, M. D., Health Officer.

THE HOUSING OF THE POOR IN NEW YORK.

THE question of housing the poor in New York has been treated with so much energy in recent years that the example given on the other side of the Atlantic might be studied with advantage by those who are interested in the problem at home. An excellent opportunity is afforded at the Health Exhibition for this purpose. Notice was not received in sufficient time to secure a general representation of American sanitary work, nevertheless, the editor of an American technical journal, THE SANITARY ENGINEER, collected, in answer to a cable-telegram received four days before sailing, plans from the New York Board of Health and other sources, which he has exhibited at his own expense. By this energetic act of patriotism we have now within easy access official documents and plans illustrating what has been done in New York. There the difficulties were even greater than those that beset us in London. What is known as the city lots are covered with the poorest tenements. The lots are situated back to back with streets sixty feet wide. Each lot has twenty-five feet of frontage and runs back a distance of one hundred feet. It was customary to build over 90 feet, so that the back yard was only ten feet wide. When we consider that the houses are five stories high, with four tenements on each floor, it is easy to imagine the unwholesomeness of these huge dwellings thus crowded together. Interested persons succeeded, however, in impeding legislation on this subject till the year 1879, when the opposition was broken down. THE SANITARY ENGINEER had offered a prize for the best plan which, while securing light and air, would pay for investment on the usual city lot. The exhibition of more than two hundred plans excited exceptional interest; committees were formed, and, in response to the efforts of devoted citizens, among whom it is only right to record the names of Messrs. D. Willis James, F. B. Thurber, H. E. Pellew, and Robert Gordon, an act was passed restricting the building to sixty-five per cent. of the lot, so that the back yards now measure thirty-five feet. The following year the same committee obtained the enactment of another law, by which all plumbers had to be registered and were not allowed to execute any work that was not approved by the Board of Health. The text of these laws and drawings, illustrating their practical application, are now to be seen at the Health Exhibition, and should be examined by medical officers and sanitary legislators. It will be found that the regulations affecting plumbing are much in advance of anything we have in England. For instance, the through ventilation of soil-pipes is compulsory, and New York plumbers who have failed to carry out these principles have been arrested and fined as much as £50.—*Lancet*.

YELLOW FEVER VACCINATION.

A CONTEMPORARY recently published a letter from Dr. Dominigos Freire, of Rio Janeiro, concerning the vaccinations which he has been practicing for the prevention of yellow fever. We have been exceedingly skeptical as to the discoveries of the yellow fever germ and its successful culture, as from time to time announced during the past two years by Dr. Freire, and if his experiments do not rest on a sounder scientific basis than the statistics which he gives in that letter, our doubts are fully justified. He says:

"Up to this date (May 1, 1884) I have vaccinated 450 persons, for the most part foreigners recently arrived. Freedom from yellow fever has been pronounced among those thus vaccinated, but they have passed through quite a severe epidemic, and only six deaths have occurred among the 450 vaccinated persons—that is to say, less than two in a hundred, while more than a thousand deaths have occurred among the non-vaccinated, the mortality among the non-vaccinated sick being about thirty to forty per hundred. Thus, if we take one hundred vaccinated persons, under the most favorable conditions as regards receptivity, we have only two deaths during the entire epidemic; if we take one hundred non-vaccinated sick, we have thirty to forty decedents, which gives a mortality fifteen times greater among the non-vaccinated. Even if the mortality were only ten times or five times less great among the vaccinated, the preventive measure would be worthy of adoption."

Dr. Freire is a professor in the Faculty of Medicine of Rio Janeiro and President of the Board of Health of Brazil, and it seems hardly probable, therefore, that he should be so ignorant as not to see the difference between statistics based on a certain number of well persons and those of a certain number of sick persons. Of one hundred well persons vaccinated two died; of one hundred sick not vaccinated thirty died. And what does that prove? Nothing. If Dr. Freire had told us how many of those whom he vaccinated took yellow fever, and then how many

of these died, a comparison might have been possible. But if Dr. Freire is not so ignorant as to fail to see the absurdity of his conclusion that the mortality is fifteen times greater among the non-vaccinated, then he is deliberately juggling with figures to convey a false impression. We prefer to believe that he is ignorant, difficult as it is to conceive of such ignorance, and we do this the more readily, because to assume that he understand scientific reasoning is to assume that he thinks that the physicians and sanitarians of the United States are such fools that they cannot see the transparent fallacy of his statements.

But if Dr. Freire does not know the difference in his statistical data, his knowledge of experimental culture methods is open to question. As a matter of fact, he has not yet produced any evidence that he has discovered the yellow fever germ. The disease which he has produced in fowls by inoculations is probably not yellow fever, and all of his statements with regard to his so-called discoveries must be regarded with great doubt.

PARASITES IN MACKEREL.

PROF. HUXLEY recently wrote to a Mr. Sayer, of London, regarding certain sensational statements in the papers, as follows: "The three mackerel, one English, one Irish, and one Norwegian, which you left with me yesterday, are as fine, wholesome fish as I ever saw. With reference to the newspaper cuttings which you have sent me, and one of which I subjoin, all I have to say is that the paragraph which I have underlined is extremely misleading. It is perfectly true that mackerel, like all other fish, are more or less infested by parasites, one of which, a small thread-worm, is often so abundant as to be conspicuous when the fish is opened. But it is not true that there is any reason to believe that this thread-worm would be injurious to a man, even if he swallowed it uncooked and alive, and to speak of it as a possible cause of cholera is sheer nonsense. I have no doubt that the 'excessive use of mackerel and mild ale,' whether separately or in combination, would be followed by unpleasant results, not only at this season of the year, but at any other. But I undertake to say that the consequences would be the same whether the fish contained thread-worms or not. It is very much to be regretted that the food-supply of the people should be diminished, and that the fishing population should be robbed of the fruit of their labors, by the authoritative propagation of statements which are devoid of foundation; and if you think the publication of this letter will be of any use to the public and to the fishing interest, it is at your service."

NUISANCE—DAM ON WATERCOURSE.

A RAILROAD company built a dam across a creek to give it water for its engines, and the owner of a mill sued for damages for the obstruction and diversion of the water, but he was defeated. The case, *Anderson vs. The Cincinnati Southern Railroad Co.*, was taken on appeal to the Court of Appeals of Kentucky, where the judgment was reversed. Judge Lewis, in the opinion, said: Water may, by a riparian owner, be withdrawn from a stream by ordinary means, or by artificial channels, for the purpose of supplying the wants of men and animals, even to the extent of producing a material diminution in the force and volume of the current; but it cannot be withdrawn for the purpose of irrigation, or for any secondary and artificial purpose, except in such a reasonable and legitimate way as not to interfere unjustifiably with its general use. If the dam has to any extent so obstructed or diverted the water, the erection of it by the company was an unlawful invasion of the miller's rights, which are put at hazard and may be lost by acquiescence, and he is therefore entitled to at least nominal damages; and he may also recover substantial damages for any material and perceptible injury done to his mill by reason of the dam.—*Exchange*.

THE "pig-nuisance" has excited the people of Union Township, Bergen County, N. J., to that point that they threaten to apply to the next Legislature to abolish the County Board of Health, if it does not cause the nuisance to be abated. The hog-breeders are termed in the complaint "the most brutish, dirty, and piggish set of people to be found in the limits of the bailiwick."

THE new Board of Health, of Newark, N. J., has inspected the Italian tenements, and found nuisances justifying in its opinion the demolition of the buildings.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JULY 19, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.					Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.					
NORTH ATLANTIC CITIES.																								
Portland, Maine	35,000	13	19.3	1	7.6	1	1	3	2	2	3	1	4	2	1	1	1	3	1	1	1	1	5	
Boston, Mass.	435,000	181	21.6	86	47.5	8	1	24	1	49	3	1	4	2	1	1	1	3	1	1	1	1	5	
Lowell, Mass.	71,500	33	16.7	13	56.5	1	1	2	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	
Worcester, Mass.	69,000	30	22.6	15	50.0	1	1	2	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	
Fall River, Mass.	67,000	33	25.6	22	66.6	1	1	2	1	14	1	1	1	1	1	1	1	1	1	1	1	1	1	
New Haven, Conn.	69,500	36	26.9	22	61.1	1	1	5	1	20	2	1	1	1	1	1	1	1	1	1	1	1	1	
Providence, R. I.	125,000	40	16.6	20	72.5	1	1	4	2	15	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total	872,000	356	21.2	188	52.8	13	2	42	4	120	6	6	6	3	5	2	6	1	1	1	1	10		
EASTERN CITIES.																								
Albany, New York	103,000	44	22.2	20	45.4	1	1	8	11	11	1	1	1	1	1	1	1	1	1	1	1	1	1	
New York, New York	1,355,000	870	33.4	510	58.6	22	3	84	9	295	15	1	5	8	2	3	1	16	1	31	5	10	8	
Brooklyn, New York	670,000	371	29.8	237	63.8	11	3	30	2	157	7	1	2	2	2	14	1	4	1	4	3	1	1	
Hudson County, New Jersey	225,000	105	24.3	51	48.5	4	1	10	1	15	1	1	1	1	1	1	1	1	1	1	1	1	1	
Newark, New Jersey	154,000	80	27.0	44	55.0	1	1	15	1	13	1	1	1	1	1	1	1	1	1	1	1	1	1	
Philadelphia, Pa.	940,000	470	28.0	247	52.5	11	2	54	6	93	10	2	12	1	6	11	4	1	1	1	1	1	1	
Wilmington, Delaware	50,000	26	27.0	16	61.5	1	2	4	1	5	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total	3,497,000	1,966	20.2	1,125	57.2	49	8	195	19	580	31	5	24	14	30	64	5	32	2	36	15	1	24	
LAKE CITIES.																								
Buffalo, New York	105,000	35	17.3	10	28.5	1	1	7	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	
Rochester, Ohio	105,000	35	17.3	10	28.5	1	1	7	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	
Cleveland, Ohio	140,000	106	30.4	63	59.4	1	1	12	3	14	7	1	1	1	1	1	1	1	1	1	1	1	1	
Detroit, Michigan	140,000	106	30.4	63	59.4	1	1	12	3	14	7	1	1	1	1	1	1	1	1	1	1	1	1	
Chicago, Illinois	650,000	369	29.5	204	71.5	9	1	12	3	14	7	1	1	1	1	1	1	1	1	1	1	1	1	
Milwaukee, Wisconsin	650,000	369	29.5	204	71.5	9	1	12	3	14	7	1	1	1	1	1	1	1	1	1	1	1	1	
Total	895,000	510	20.6	337	66.0	9	2	29	4	184	8	6	4	19	1	14	1	13	4	4	4	4	4	
RIVER CITIES.																								
Pittsburg, Pa.	210,000	81	20.0	46	56.7	5	1	5	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	
Cincinnati, Ohio	275,600	108	20.4	45	47.6	4	1	18	1	28	4	1	1	1	1	1	1	1	1	1	1	1	1	
Louisville, Ky.	137,000	64	24.3	26	40.6	2	1	13	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	
Indianapolis, Ind.	100,000	56	26.1	43	76.7	2	1	4	1	30	1	1	1	1	1	1	1	1	1	1	1	1	1	
Minneapolis, Minn.	100,000	56	26.1	43	76.7	2	1	4	1	30	1	1	1	1	1	1	1	1	1	1	1	1	1	
Evansville, Ind.	34,000	19	20.1	7	36.8	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	
St. Louis, Mo.	375,000	192	26.6	99	51.5	11	2	12	1	47	4	1	1	1	1	1	1	1	1	1	1	1	1	
Total	1,131,600	520	23.9	266	51.1	25	2	54	111	12	8	4	7	11	5	3	5	3	4	4	4	4	4	
SOUTHERN CITIES.																								
District of Columbia	133,800	58	22.5	24	41.3	1	1	11	1	13	2	1	1	1	1	1	1	1	1	1	1	1	1	
Richmond, Va.	60,300	46	34.5	28	80.8	1	1	4	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	
Charleston, S. C.	41,000	21	26.6	7	33.3	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Atlanta, Geo.	32,400	25	40.2	15	80.0	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Savannah, Geo.	25,000	8	16.0	4	32.0	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Augusta, Geo.	27,800	29	54.3	14	48.2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Memphis, Tenn.	30,000	8	18.8	4	50.0	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	
Nashville, Tenn.	20,000	10	34.7	5	50.0	1	1	2	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	
New Orleans, La.	171,000	87	26.5	38	43.6	3	1	7	1	6	1	1	1	1	1	1	1	1	1	1	1	1	1	
Total White	500,600	210	21.8	87	41.4	5	1	23	1	30	5	8	13	2	1	1	1	1	1	1	1	1	1	
Total Colored	200,800	206	40.1	107	52.1	7	1	26	1	32	5	8	13	2	1	1	1	1	1	1	1	1	1	
Total in 31 U. S. Cities	7,162,500	3,767	27.4	2,110	56.0	108	15	369	28	1066	64	5	55	37	48	101	14	59	4	57	25	4	46	
July 5. Total in 28 English Cities	8,762,354	3,279	19.5	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	124	
" 5. " 8 Scottish Cities	1,254,607	526	21.8	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	
" 5. " 16 Irish Cities	858,660	332	20.1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
" 5. " 139 German Cities	455,537	177	20.2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending July 19, 1884, in 31 cities of the United States, having an aggregate population of 7,162,500, there were reported 3,767 deaths, which is equivalent to an annual death-rate of 27.4 per 1,000. In the North Atlantic cities the rate was 21.2; in the Eastern cities, 29.2; in the Lake cities, 20.6; in the River cities, 23.9; and in the Southern cities, for the whites 21.8, and for the colored 40.1 per 1,000. The infant mortality continues high, 56 per cent. being children under 5 years, the proportion of deaths of this class being highest in the Lake cities—viz., 66 per cent.

Accidents caused 2.8, consumption 9.7, diarrhoeal diseases 28.2, and diphtheria 1.6 per cent. of all deaths. The percentage from diarrhoeal diseases was highest in the Lake cities, 35.9, and lowest among the Southern whites, 14.2. Typhoid fever caused 1.4, malarial fevers 0.9, scarlet fever 1.2, pneumonia 2.6, bronchitis 1.5, measles 1.5, small-pox 0.1, and whooping-cough 1.1 per cent. of all deaths. The percentage of deaths from whooping-cough was highest in the North Atlantic cities—viz., 2.7. The low mortality in the English, Scotch, Irish, and Swiss cities, as compared with our own, is noteworthy.

BOSTON, MASS.—C. E. Davis, Jr., reports 11 new cases of diphtheria, 52 of scarlet fever, and 10 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 14 new cases of scarlet fever and 28 of diphtheria.

BALTIMORE, MD.—The Health Officer reports for the week 183 deaths, equivalent to an annual death rate of 23.24 per 1,000 for the whole population, or 22.2 for the white and 29.4 for the colored. Of the decedents 103, or 56.2 per cent., were children under 5 years of age. Diphtheria caused 2 deaths, croup 1, scarlet fever 3, measles 2, whooping-cough 3, typhoid fever 3, malarial fevers 3, diarrhoeal diseases 60, consumption 16, acute lung diseases 4, and violence 3.

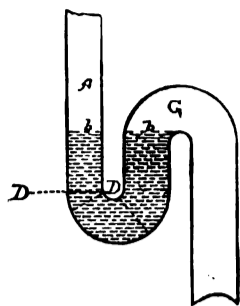
MASSACHUSETTS.—In 107 towns of the State, with an aggregate population of 1,385,681, there were, during the week ending July 12, 471 deaths, which is equivalent to an annual death-rate of 17.6 per 1,000. Of the decedents 203 were under 5 years of age. The zymotic diseases caused 122 deaths, among which were diphtheria and croup 12, diarrhoeal diseases 81, whooping-cough 12, cerebro-spinal meningitis 6, and typhoid fever 4. The highest rates recorded were 30.6 in Holyoke, and 34.8 in Fall River.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales for the week ending July 5 was 19.5 per 1,000. Small-pox caused 30 deaths in London, not including 11 in the Metropolitan Asylum Hospitals; also 3 in Liverpool, 2 in Sheffield, and 1 in Hull.

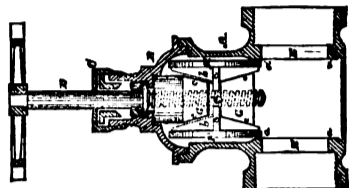
LONDON.—Births, 2,458; deaths, 1,508, the latter being equivalent to an annual death-rate of 19.6 per 1,000. The number of small-pox patients in the hospitals at the close of the week was 1,449, against 1,373 for the

previous week. The fatal cases of small-pox numbered 30; in addition to these, however, 11 deaths of London residents occurred in the hospitals outside of registration London. Measles caused 56 deaths, scarlet fever 26, diphtheria 15, whooping-cough 53, typhoid fever 24. The increase of deaths from diarrhoeal diseases was great, there being 110 recorded, against 39 for the previous week. The deaths referred to diseases of the lungs numbered 231, and to consumption 150. Different forms of violence caused 53 deaths.

SCOTLAND.—The death-rate in the 8 principal towns for the week

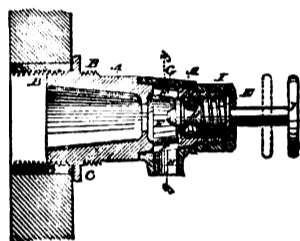


295,998. GATE OR VALVE. PHILIP GIOVANNINI. San Francisco, Cal. Filed April 30, 1883. (No model.) Issued April 1, 1884.



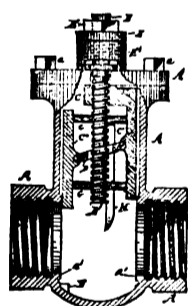
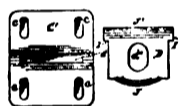
Claim.—The combination, with the stem D, mounted in the casing A B C, and carrying upon it screw-threaded lower portion the block G, formed with the reversely-inclined faces *e e*, and grooves *d*, of the disks F, provided at their inner sides with the reversely-inclined faces *b*, for engaging with the said inclined faces *e*, and with the lugs *c*, for entering the said grooves *d*, substantially as and for the purposes set forth.

296,031. FAUCET. HUGO MATTULLAH, San Francisco, Cal., assignor to the Security Package Company, same place. Filed, Sept. 17, 1883. (No model.) Issued April 1, 1884.



Claim.—In a screw-faucet, the valve D, moving within it to close or open the outlet, and having screw-threads E, stem and operating-wheel J, and chambered sleeve G, fitting the exterior of the body A, in combination with the screw-cap I, through which the valve-stem passes, all substantially as shown and described.

296,046. STRAIGHT-WAY VALVE. PETER B. PAGE, Lorain, Ohio. Filed July 24, 1883. (No model.) Issued April 1, 1884.



Claim.—The valves C C' C" and the link D, all constructed as shown, in combination with the shell A, having inner ribs, H H, lug F, and spindle B, substantially as specified, and for the purpose set forth.

296,141. COVER FOR WATER-CLOSET SEATS. DALE O. COWEN, Batavia, O. Filed June 21, 1883. (No model.) Issued April 1, 1884.



Claim.—As an improved article of manufacture, a water-closet seat cover consisting of a sheet of paper, A, provided with a hole, *b*, having a downwardly-projecting flange, *c*, extending around said hole, the said flange being integral with the body of the sheet, as set forth.

294,868. SCREW-DRIVER. WILLIAM L. PARMELEE, Ansonia, Conn. Filed October 2, 1883. (No model.) Issued March 4, 1884.

294,878. HOSE-NOZZLE. JOSEPH RICHTER, Cincinnati, O. Filed September 20, 1883. (No model.) Issued March 4, 1884.

295,089. ELECTRIC GAS-LIGHTER. EDWIN L. SHUTE, assignor to John E. Earle, New Haven, Conn. Filed November 3, 1883. (No model.) Issued March 11, 1884.

295,081. VENTILATOR. JACOB G. SLATER, Albany, N. Y., assignor of one-half to Nelson Fitch same place. Filed September 28, 1883. (No model.) Issued March 11, 1884.

295,083. GRATE. JAMES G. SMITH, Cleveland, O. Filed August 22, 1883. (No model.) Issued March 11, 1884.

295,087. DOVETAILED GROOVED BRICK FOR BUILDING PURPOSES. GEORGE E. STEARNS, New York, N. Y. Filed January 22, 1884. (No model.) Issued March 11, 1884.

295,070. STEAM-BOILER CLEANER. ROBERT STEWART, Pittsfield, Ill. Filed September 4, 1883. (No model.) Issued March 11, 1884.

295,090. DEVICE FOR PUNCHING METAL TUBES. GEORGE W. WHITMAN, St. Louis, Mo., assignor to M. C. Bignall, same place. Filed September 8, 1883. (No model.) Issued March 11, 1884.

295,109. HOSE-COUPING. WILLIAM H. BULCROFT, Cleveland, O., assignor of one-half to Alfonso Charbonneau, same place. Filed September 8, 1882. Renewed February 14, 1884. (No model.) Issued March 11, 1884.

295,112. FIRE-ESCAPE. JAMES M. CHESNUT, Muncy, Pa. Filed November 12, 1883. (No model.) Issued March 11, 1884.

295,113. SUBSTANCE FOR RENDERING FABRICS WATER-PROOF. LYMAN P. CONVERSE, Chicago, Ill., assignor to the Water-Proof Fabric Company, New York. Filed August 22, 1882. Renewed February 12, 1884. (Specimens.) Issued March 11, 1884.

Claim.—1. The process herein described of producing a pliable water-proofing compound unaffected by variations of temperature, which process consists in boiling linseed-oil at a temperature of from 620° to 700° Fahrenheit, as hereinbefore set forth.

2. As a new article of manufacture, a pliable water-proof substance unaffected by variations of temperature, consisting of linseed-oil boiled at a temperature of from 620° to 700° Fahrenheit.

3. The hereinbefore-described water-proofing compound, consisting of linseed-oil which has been independently boiled at a temperature of between 620° to 700° Fahrenheit, combined with copal-varnish and a pigment, substantially as hereinbefore set forth.

295,118. GAS APPARATUS. ARTHUR O. GRANGER, Philadelphia, Pa. Filed June 25, 1883. (No model.) Issued March 11, 1884.

295,119. TILE-LAYING MACHINE. JESSE THOMAS GRAVES and BENJAMIN F. BELT, Colo., Iowa. Filed September 10, 1883. (No model.) Issued March 11, 1884.

295,127. FIRE-ESCAPE. WILLIAM M. MILLER, New Cumberland, W. Va., assignor of two-thirds to Robert Hamilton and William Hooper, both of same place. Filed December 28, 1883. (No model.) Issued March 11, 1884.

295,256. COMPOUND FOR COATING METAL. JOSIAH H. LEGGIE, Pittsburgh, assignor of one-fourth to A. A. McCarty, Allegheny, Pa. Filed October 22, 1883. (No specimens.) Issued March 18, 1884.

Claim.—The herein-described compound for coating metals, composed of lead, zinc, tin, and borax, the borax being in the proportion of one-half of one per cent. to five per cent. of the lead and zinc employed, substantially as and for the purposes set forth.

295,278. FIRE-ESCAPE. HENRY POOLE, New York, N. Y. Filed June 1, 1883. (No model.) Issued March 18, 1884.

295,280. STEAM-TRAP. WILLIAM PUFFER and WILLE D. PUFFER, Janesville, Wis. Filed May 23, 1883. (No model.) Issued March 18, 1884.

295,281. DITCHING-MACHINE. ALONZO PURCELL, Monticello, Ill. Filed June 30, 1883. (No model.) Issued March 18, 1884.

295,293. STEAM-JET EJECTOR. LOUIS SCHUTTE, Philadelphia, Pa. Filed February 21, 1883. (No model.) Issued March 18, 1884.

295,313. FIRE-ESCAPE. AARON WALKER, Kokomo, Ind. Filed January 24, 1884. (No model.) Issued March 18, 1884.

295,315. VAPOR-BURNER. J. BENNETT WALLACE and GARSON MYERS, Chicago, Ill. Filed January 25, 1883. (Model.) Issued March 18, 1884.

295,320. FIRE-ESCAPE. WILLIAM WISE, Medway, Ohio. Filed March 12, 1883. (No model.) Issued March 18, 1884.

295,323. TILE DITCHING-MACHINE. JOHN ARTHUR, Streator, Ill. Filed October 15, 1883. (No model.) Issued March 18, 1884.

295,327. FILTER. EDWIN L. BARBER, Chicago, Ill. Filed August 3, 1883. (No model.) Issued March 18, 1884.

295,328. SECTIONAL STEAM-BOILER. HERMAN A. BARNARD, Moline, Ill. Filed December 13, 1883. (No model.) Issued March 18, 1884.

295,330. CISTERN. JAMES WESTFALL BARNUM, New Orleans, La. Filed August 7, 1883. (No model.) Issued March 18, 1884.

295,334. ARTIFICIAL PAVEMENT AND CONDUIT FOR ELECTRIC WIRES. WALTER BERRY and PETER STUART, Edinburgh, county of Mid-Lothian, Scotland. Filed September 19, 1883. (No model.) Patented in England April 14, 1883, No. 1,094, and in France October 13, 1883, No. 158,018. Issued March 18, 1884.

295,343. STEAM-RADIATOR. ROBERT BRASS and JOHN CHAPMAN, Brooklyn, N. Y. Filed June 9, 1883. (No model.) Issued March 18, 1884.

295,354. VISE. WILLIAM H. CLOUD, Detroit, Mich. Filed January 25, 1884. (No model.) Issued March 18, 1884.

295,415. GAS-ENGINE. JOHANNES A. MENCK and ALEXANDER HAMROCK, Ottensen, near Altona, Germany, assignors by mesne assignments, to William E. Hale, Chicago, Ill. Filed January 1, 1884. (No model.) Patented in Germany April 25, 1879, No. 13,673, October 10, 1879, No. 13,674, and January 6, 1880, No. 14,763. Issued March 18, 1884.

295,355. FURNACE. VICTOR COLLIARD, Detroit, Mich. Filed October 16, 1883. (No model.) Issued March 18, 1884.

295,421. SCREW-TAP. ANDREW J. PEAVEY, Somerville, assignor to himself and Edwin B. Buckingham, Brookline, Mass. Filed May 1, 1883. (No model.) Issued March 18, 1884.

295,422. SCREW-CUTTER. ANDREW J. PEAVEY, Somerville, assignor to himself and Edwin B. Buckingham, Brookline, Mass. Filed May 1, 1883. (No model.) Issued March 18, 1884.

295,430. FIRE-ESCAPE. HORACE RESLEY, Cumberland, Md. Filed May 25, 1883. (No model.) Issued March 18, 1884.

295,444. EARTH-AUGER. SAMUEL S. SHERMAN and JEREMIAH G. SHERMAN, West McHenry, Ill. Filed December 27, 1883. (No model.) Issued March 18, 1884.

295,465. FIRE-ESCAPE. CHARLES VON DER LINDEN, Rhinebeck, N. Y. Filed October 24, 1883. (No model.) Issued March 18, 1884.

295,477. FIRE-ESCAPE. VETAL BESSIER, New York, N. Y., assignor of one-half to Henry A. Robbins, Washington, D. C. Filed December 20, 1883. (No model.) Issued March 18, 1884.

295,499. VENTILATING APPARATUS. WILLIAM LORD, Middlesbrough, county of York, England. Filed July 16, 1883. (No model.) Patented in England March 28, 1883, No. 1,567. Issued March 18, 1884.

295,504. TAP-WRENCH. MERRITT S. BROOKS, Chester, Conn. Filed January 30, 1884. (No model.) Issued April 1, 1884.

295,526. FILTER. JAMES M. LEARNED, Boston, assignor to Dexter F. Bennett, Somerville, Mass. Filed June 26, 1883. (No model.) Issued April 1, 1884.

295,529. FIRE-ESCAPE. THOMAS MACDONOUGH, Benton, Mich. Filed December 8, 1883. (No model.) Issued April 1, 1884.

295,531. MANUFACTURE OF ARTIFICIAL STONE. MONROE McNAMARA, Mexico, Mo. Filed December 26, 1883. (No specimens.) Issued April 1, 1884.

Claim.—The herein-described composition of matter, consisting of Portland cement, sand, ground or pulverized or comminuted glass, plaster-of-paris, pitch, paper-pulp, sal-soda, litharge, and alum, in or about in the proportions set forth.

295,578. PRESSURE-REGULATOR. WILLIAM BURNETT, New York, assignor of one-half to James Keilly, Brooklyn, N. Y. Filed July 12, 1883. (No model.) Issued April 1, 1884.

295,588. METALLURGICAL GAS-FURNACE. WILLIAM F. DUFFEE, Bridgeport, Conn., and THOMAS EGGLESTON, New York, N. Y. Filed June 27, 1882. Renewed March 6, 1884. (No model.) Issued April 1, 1884.

295,589. VENTILATING-DOOR. HENRY W. EASTMAN, Baltimore, Md. Filed September 10, 1883. (No model.) Issued April 1, 1884.

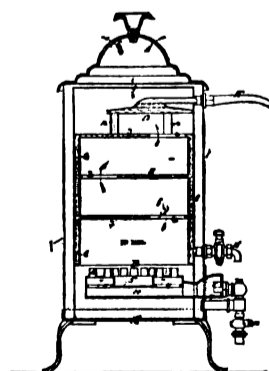
RE-ISSUES.

10,452. HYDRANT. NANCY RACE, Volney, N. Y. (Administratrix of Washburn Race, deceased) and SAMUEL R. C. MATHEWS, Philadelphia, Pa.; said Washburn Race and Mathews assignors, by mesne assignments, to S. R. C. Mathews, Richard Wood, Edward R. Wood, George Wood, Randolph Wood, (I. H. Johnson, Administrator of said Randolph Wood, deceased) and Walter Wood, all of Philadelphia, Pa. Filed October 31, 1882. Original No. 96,959, dated November 16, 1869. Issued February 26, 1884.

10,457. CENTRIFUGAL FILTERING OR STRAINING APPARATUS. S. MORRIS LILLIE, Philadelphia, Pa. Filed January 28, 1884. Original No. 252,783, dated January 24, 1882. Issued March 4, 1884.

English Patents.

3,585. IMPROVEMENTS IN OR APPLICABLE TO THE CONSTRUCTION OF WATER-HEATING APPARATUS.

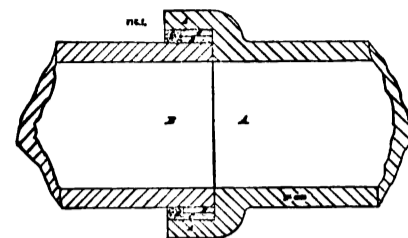


This invention relates to certain improvements in or applicable to the construction of water-heating apparatus, especial objects of the invention being to effect a more rapid heating of the water than has been hitherto obtainable and with a less and more economical consumption of the heating agent.

The improvements constituting the invention are more especially applicable to water-heating apparatus of the kind which is used for the heating of water for baths or for the heating of greenhouses or conservatories.

GEORGE SHREWSBURY, of 68 Barrington Road, Brixton, in the county of Surrey, and 59 Old Bailey, in the county of Middlesex, manufacturer. Prov. Spec. February 19, 1884. Com. Spec. March 17, 1884. (Price 6d.)

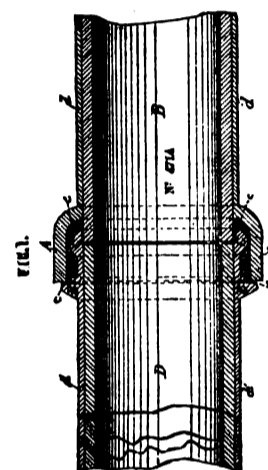
4,223. IMPROVEMENTS IN JOINTS FOR EARTHENWARE PIPES AND IN THE MEANS EMPLOYED FOR PRODUCING THE SAME.



This invention has for its object improvements in joints for earthenware pipes and in the means employed for producing the same.

HENRY DOULTON, of Lambeth, in the county of Surrey. Prov. Spec. September 1, 1883. Letters patented March 1, 1884. (Price 6d.)

4,714. IMPROVEMENTS IN THE JOINTS OF WATER AND OTHER PIPES, AND IN THE TREATMENT OF SUCH PIPES WHEN MADE OF STONEWARE OR OTHER POROUS MATERIAL, SO AS TO RENDER THEM IMPERVIOUS.



The invention relates first to improvements in the joints of water and other pipes, so as to make them perfectly true and to facilitate the making of such joints when laying the pipes.

This part of the invention consists essentially in using lengths of pipe which are plain from end to end, and making the whole of the parts which are to actually form the joint after the pipes themselves have been made by any suitable means. These parts to form the joint may be either cast on the ends of the plain pipe, or they may be made separate from the pipe and the latter inserted therein when desired to make the joint in laying the pipes, or they may be partly cast on the pipe, and partly separate therefrom.

JAMES ROBBINS, of 78 Frithville Gardens, Uxbridge Road, in the county of Middlesex. Prov. Spec. October 4, 1883. Letters patented April 4, 1884. (Price 6d.)

Association News.

MASTER PLUMBERS OF BOSTON AND VICINITY.—The Master Plumbers of Boston and vicinity held their regular meeting on the evening of the 17th inst. A large number of out-of-town delegates was present, and quite an interesting discussion took place on the question relating to dealers in plumbers' materials. A great difference of opinion was expressed, and the matter was left for future debate and consideration. The following circular has been issued and will be sent to the various associations in the State:

"The Master Plumbers' Association of Boston and vicinity has appointed a committee of fifteen of its members to confer with the dealers in plumbing materials, in order to secure an equitable system of prices and discounts.

"Our committee has already had several meetings with the jobbers, and they seem desirous of complying with our wishes. In conversation with different members of our craft from other cities and towns, we are led to believe that if master plumbers from all parts of the State could be brought into consultation with our committee great benefits would be derived for all, by the proposed arrangement with the dealers, and in furtherance of this idea your society is invited to be represented at the next meeting of the committee, which will occur at on

"If the master plumbers of your locality have no association, will you please give this matter your earnest attention, and attend the meeting of our committee in person. Fraternally yours, James F. Davlin, Corresponding Secretary, Somerville, Mass."

CINCINNATI MASTER PLUMBERS.—The Master Plumbers' Association held its regular meeting Wednesday evening, and the experiment of holding meetings in the evening, instead of the afternoon, as heretofore, seems likely to prove a success. The attendance was large, and an unusual interest manifested. In the absence of the President, Mr. Allison, who is in Chicago in attendance at the meetings of the Executive Committee of the National Association of Plumbers, the Vice-President, Mr. Richard Murphy, occupied the chair. After the usual routine business had been transacted, the constitution of the association was amended by striking out the clause requiring that all applicants for membership be practical plumbers, and substituting therefor a clause to the effect that any reputable person carrying on the plumbing business be eligible to membership. The members then balloted for and elected four new members. In the discussion that followed, the main point of debate was what the master plumbers would be justified in requiring of the dealers; the spirit of the meeting being that some protection should be granted to the plumbers by the dealer, some of the members present advocating that he should be required to sell to plumbers only, others that the members should be allowed a discount on the prices at which an outside party could purchase. Several plans of operation were proposed, but laid over for a more thorough investigation and debate. The association, for the future, will hold its meetings weekly, and the renewed interest that appears to have taken hold of the members is a matter of great encouragement to the faithful few who have kept the association alive in the face of many discouragements and reverses.

THE MASTER PLUMBERS OF THE DISTRICT OF COLUMBIA have tendered their services to the District Commissioners as an auxiliary sanitary corps, to act under the direction of the Health Officer of the District, as recommended in the recent circular of President Young, of the National Association.

BALTIMORE MASTER PLUMBERS.—The Master Plumbers' Association of Baltimore held its regular meeting July 17, First Vice-President William H. Rothrock presiding. No recording secretary being elected to fill the position made vacant by the resignation of Mr. James Millar, Jr., Mr. Peter Kreise acted as recording secretary for the evening. Several nominations for recording secretary were made, and declined, so the matter was postponed until next meeting. The reports of the different committees on the convention were read and accepted, and the committees highly commended on the success of their labors. It was on motion decided to enforce the constitution against delinquents. The majority believe that it is better to have none but good, active members on the roll, and that it is time to get rid of the drones in the hive. The association is sorry to hear of the sickness of Mr. Alexander Low. Mr. Low and his family have the heartfelt sympathies of the members in this sad hour of their affliction.

THE INSTITUTE OF AMERICAN ARCHITECTS will meet in Albany October 22, in four days' session.

Notes.

CONSTRUCTION.

CHICAGO.—The Pittsburg Bridge Company takes the contract for building the superstructure of the Chicago viaduct, at \$96,000.

The Forest City Stone Company, of Cleveland, takes a \$3,500 contract for flagging on Prairie Avenue.

CHICAGO PUMPING STATION.—The new engines and pumps for the West Side pumping-works, which were contracted for nearly two years ago, are in place at last, and will to-day be formally turned to the city, and by Monday, July 21, it is thought, they will be in operation. The pumps are two in number, with cylinders fifty-two inches in diameter, and cost the city \$257,000. Their capacity is 30,000,000 gallons of water per day, which, added to the capacity of the old pumps, will give the city a water-supply of about 140,000,000, or a surplus over the present average demand of at least 50,000,000 gallons. The increase has been made at a total cost of about \$300,000, and was urgently needed, as has often been pointed out in these columns, and the work has gone along so quietly that scarcely any one not directly connected with the enterprise has heard anything about it. And that the increase has been made without extravagant expenditures is shown by comparison with a similar improvement recently made in

New York, where only 10,000,000 gallons were added to the supply, and where the cost was three times as great as 30,000,000. As soon as the new pumps are in complete working order the water-supply will be ample, and the effect will be seen at once in the force of the water, which will be sufficient at all times to afford an abundant supply of the fluid in the highest buildings throughout the city. The supply will be sufficient also to put into effect the system for the extending of the city's water into the town of Jefferson, which has been so long contemplated.—*Chicago Times*.

JERSEY CITY WANTS TILE-PIPE.—The Board of Public Works, George Bouton, Clerk, will receive proposals until August 4, for the construction of a sewer in Glenwood Avenue, requiring about 1,350 lineal feet of 10-inch vitrified-pipe sewer, about 14 manholes complete, about 10 cubic yards of concrete, about 50 cubic yards of rock excavation, and about six receiving basins.

ST. PAUL, MINN.—The Board of Water Commissioners received bids, July 17, for an iron truss for the pumping station as follows: Herzog Manufacturing Co., \$3,700; Pittsburg Bridge Co., \$4,495; Milwaukee Bridge and Iron Works, \$4,200. The bids were referred to the engineer for report.

WATERTOWN, MASS.—The town, in town meeting, has voted to contract with the Watertown Water-Supply Company for a supply of water on the basis proposed by the company, which is substantially as follows: The company will erect buildings and build suitable filtering galleries, with steam-pump of the capacity of 1,000,000 gallons per day and an auxiliary pump of 500,000 gallons per day, and build a reservoir at an elevation which shall give a full supply of water to all the houses on White's Hill. The system is to be direct pumping. The company will lay fourteen miles of wrought-iron, cement-lined, and of cast-iron pipes, 4-inch to 10-inch, with 135 hydrants and gates, stops, blow-outs, etc., etc., and will extend the pipes to such other parts of the town as the town may direct. The town is to pay to the Watertown Water-Supply Company for the use of 135 hydrants for fire purposes \$6,000 per annum, and \$35 per annum for each hydrant on the extended pipe, as above named, for the term of fifteen years.

PHILADELPHIA.—The Gas Trust has awarded contracts for one vertical tubular boiler, 11 feet 11 inches high and 54 inches in diameter, to Sidebotham & Pouree at \$800; for one gas exhauster, having a capacity of 150,000 cubic feet per hour, to Wilbraham Brothers, at \$3,350, and for the labor of lining the lime-kiln with soapstone to E. D. Smith, for \$650.

Contracts were awarded at the Highway Department for the construction of 2'x3' sewer, on Berks Street from Park Avenue to Ontario, a length of 105 feet, to M. C. Hong, at \$2.27 per linear foot, and \$24 each for the five manholes, and wellholes \$100 each; for a 2'x3' sewer on Sixteenth Street, from Clearfield to a point 475 feet south of Indiana Street, a total length of 1,050 feet, to Henry C. Eyre, at \$2.25 per linear foot, \$27 for each of the manholes, \$97 per wellhole, inlets at \$87, \$79, and \$72 each. The committee also awarded the Vulcanite Paving Co. the contract for paving Chant Street from Tenth Street to the back of the new post-office, at \$2.50 per square yard.

ANN ARBOR, MICH.—Prof. C. E. Greene has sent in an elaborate report to the special committee on water-works. He estimates the cost of a water-power, with reservoir, at \$111,000; water-power, direct supply, \$111,100; steam-power, with reservoir, \$97,350; steam-power, direct supply, \$90,400. These computations are for a supply of one million gallons of water per day with a reservoir, or 100,000 gallons per day with a direct supply. Prof. Greene recommends the reservoir system with either water or steam-power.

GRAND RAPIDS, MICH.—This city is to have a new city-hall, the estimated cost of which is \$200,000.

ADRIAN, MICH.—The contract for building the new city-hall has been awarded to Beck & Vogt; price, \$13,670.

INDIANAPOLIS, IND.—Bids for the erection of the new workhouse have been opened by the commissioners, and on the building complete the following figures were placed: John R. Cowie, \$87,334; Peter Routier, \$92,000; Lewis F. Burton, \$94,300; Jongclaus & Shumacher, \$91,282; Shouer & Christian, \$91,676; J. W. Hinkley, \$94,256.

ROCHESTER, N. Y.—The Chairman of the Executive Board has signed a contract with R.

D. Wood & Co., of Philadelphia, to furnish 100 tons of iron pipe for water-mains. The price paid was \$34.60 per ton, and it is stipulated in the contract that the pipe shall be delivered by August 20.

BUFFALO, N. Y.—The Water Commissioners have awarded the contract for laying a 20-inch steel pipe across Buffalo River as follows: Iron-work, Farrar & Trest; sinking pipe and dock-work, Peter Hickler; dredging, Hingston & Wood. The work is to be completed by the 1st of August, and will cost \$4,800. The laying of 16-inch pipe in Ganson Street was commenced July 21. The entire cost to the city of furnishing the island with water will be \$32,700.

PLANS WANTED.—Plans and specifications for a new public building, to be known as the Hall of Records for Kings County, adjoining the Court-House, in the city of Brooklyn, will be received by the committee of the Board of Supervisors until September 18. The Board offers premiums to competing architects as follows: \$400 to the one whose plans, etc., shall be adjudged to be the best; \$250 to the second best; \$200 to the third best; \$100 to the fourth best, and \$50 to the fifth best. Address, Special Committee on Hall of Records, Kings County, N. Y.

MONSTER RUSSIAN BRIDGE.—It is reported from Russia that the question is being agitated of connecting Cronstadt and Oranienbaum by a bridge, at a cost of £2,400,000. The structure is to rest upon granite pillars fixed by the caisson method, each of them protected from the action of the waves during the prevalence of southwest winds by an angular wall-like guard of stone. The bridge will be about five miles in length, and it is expected to be completed by 1889. When finished—if it ever is finished—it will consist of two parts, a railway and a foot-bridge.—*Engineering News*.

The sub-soil irrigation for disposing of the sewage of the Hotel Balmoral, Mt. McGregor, Saratoga, and also for the residence of Hon. Rufus Peckam, at Knowersville, N. Y., is to be done by Mr. Richard Prescott, of Albany, N. Y.

The E. H. Cook Co. has received the contract for the steam-heating and ventilating, at \$8,303, of school building No. 31; also the Buffalo Medical College, at \$2,500.

GOVERNMENT WORK.

COURT-HOUSE AND POST-OFFICE, MONTGOMERY, ALA.—Synopsis of bids for marble floor-tiling, marble mantles, etc., opened July 18: Emil Fritsch, \$3,357; Pickel Stone Manufacturing Co., \$3,109.50; Burlington Manufacturing Co., \$3,100; Sherman & Flavin, \$2,948; Davidson & Sons, \$2,650; J. A. Curbow, \$3,900; G. & R. L. Barney, \$3,125.

TREASURY BUILDING, WASHINGTON, D. C.—Synopsis of bids for boilers and radiators, opened July 23: Marshbank & Tippet, boilers, \$6,500; radiators, \$921; John Lyon, \$15,700, \$1,525; Bartlett, Hayward & Co., \$14,000, \$1,498.

INTERIOR DEPARTMENT BUILDING, WASHINGTON, D. C.—Synopsis of bids for iron-work on roof, opened July 19: Bartlett, Hayward & Co., Baltimore, \$13,000; Haugh, Ketcham & Co., Indianapolis, \$7,843; W. D. Jackson & Co., New York City, \$7,241; Phoenix Iron Co., Trenton, \$9,987; White & Co., Washington, \$11,649.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
July 26.....	23.64	17.82	21.95	28.21	26.67	18.72

E. G. LOVE, Ph.D., *Gas Examiner*.

It is said that the water-gas war will soon break out in Detroit, Mich. The usual preliminary flourish of trumpets, otherwise newspaper interviews, has begun.

The Economy Gas Company is asking permission to lay its pipes in the district of Philadelphia now controlled by the Northern Liberties Gas Company. The new company proposes to furnish gas at \$1.50 per 1,000 cubic feet.

A SUCCESSFUL experiment in the application of electric-motors to street railways is reported to have been made by the East Cleveland, O., Railroad Company, July 26. The company was sufficiently satisfied to contemplate the extension of electricity to their whole service.

AN explosion similar to that in the Wheeling bank occurred in this city July 23, in the dry-goods store of Arnold, Constable & Co., on Broadway. A smell of gas being observed two porters searching for the leak, opened the door of the fire-proof vault; one of the men lit a match, and instantly a violent explosion occurred, severely burning both men. A panic was created among the clerks and customers, but no others than the porters were injured.

THE South Side Gas Co., of Chicago, recedes from its offer of gas to the city for \$1 per 1,000 cubic feet, and will now charge \$1.65. There are frequent collisions, as it were, of the pipes of the old company and those of the new (Consumers' Company), and the work of laying the latter is somewhat impeded. President Billings, of the West Side Gas Co., is authoritatively quoted as saying he will run the price down to 50 cents, to keep the Consumers' Company from invading the West Division.

THE electric-light system introduced by the American Electric and Illuminating Company of Boston, in the name of the Hartford Electric-Light Company, has passed into the control of Hartford men, the papers being signed Monday. The company has a special charter and the capital stock is \$100,000. The officers are: President, A. C. Dunham; Vice-President, H. M. French; Secretary, S. C. Dunham; Treasurer, Howard M. Clark; Superintendent, F. A. French.

AN explosion of gas occurred in the Wheeling, W. Va., German Bank July 23, which severely injured the chief clerk, and destroyed the glass front of the building. The gas escaped into the vault of the bank through a small burner, which is regularly kept lighted all the time, but it happened that on the evening before the explosion, owing to some repairs on the street-main, the gas had been shut off from the bank and the burner-light extinguished. On turning on the gas in the street it escaped into the vault, and the next morning when the chief clerk struck a match to light the burner the explosion took place.

THE bulletin of the French Telephonic Society calls attention to a complete interruption on most of the telegraphic lines for forty-eight hours, caused by a violent tempest. The subterranean wires which united Paris with the principal cities of Northern and Eastern France worked, however, without interruption, so as not only to satisfy all their normal traffic, but also to supply much of the deficiency arising from the failure of the other lines. Had it not been for the underground wires, Paris would have been entirely cut off from all telegraphic communication with other points.—*Les Mondes*, Feb 23, 1884.

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; b s dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

223-25 7th st, 2 5-story br tens; cost, \$15,000 each; o, Fred Heerlein; a, J. Kastner.
45-47 Bowery, 5-story br and st hotel, with garden bldg in rear; cost, main bldg, \$35,000, garden bldg, \$15,000; o, Wm. A. Martin; a, L. H. Broome.
347-49 E 51st st, 2 5-story br tens; cost, ea \$18,000; o, John W. Smith; a, Wm. R. Smith.
131 W 53d st, 5-story br and st ten; cost, \$16,000; o, Christopher Mooney; a, W. S. Jennings; b, Samuel McMillan.
86th st, s s, 70 w 4th av, 2 4-story br and st dwells; cost, \$25,000 and \$27,000; o, Thomas Parson; a, Wm. Baker.
3d av, s e cor 107th st, 4 5-story b s front flats and sts; cost, ea \$18,000; o and b, Thomas McManus; a, J. H. Valentine.
310 E 63d st, 4-story br st and ten; cost, \$13,500; lessee, Henry Hohn.
2191 3d av, 4-story br furniture warehouse; cost, \$20,000; o, John Lynch; a, A. Spence.
61st st, s s, 81 w Boulevard, 5 5-story b s front flats, 20x83; cost, ea, \$18,000; o, Selig Steinhardt; a, A. B. Ogden & Son.
106th st, n s, 125 w 9th av, 5-story br flat, 25x65; cost, \$15,000; o, Henry Bornkamp; a, Maclay & Davies.
10th av, s w cor 67th st, 3 5-story br tens and sts, 25x61, and cor 71, cost, two each, \$18,000, cor \$20,000; o, Julius Johnson; a, J. H. Valentine.
10th av, w s, 50 ft n road st, 2 5-story br tens, 25x82; cost, ea, \$16,000; o, Franklin A. Thurston; a, Thos. E. Thurston.
137th st, n s, 115 e Alexander av, 4-story br dwell, school and chapel, 30x65; cost, \$14,300; o, John J. Hughes; a, A. Arcander.

THE SANITARY ENGINEER.

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THE SYPHONAGE AND VENTILATION OF TRAPS.

WE find in the *American Architect and Building News* of the 7th of June, a paper signed by J. P. Putnam and L. Frederick Rice, of Boston, and headed a "Report to the Boston City Board of Health," on this subject. The paper relates at length a series of experiments made upon traps of various patterns, with the author's deductions. As the deductions were at variance with those arrived at by Mr. E. S. Philbrick, Mem. Am. Soc. C. E., and Mr. E. W. Bowditch, published in these columns in the report of those gentlemen to the National Board of Health, and as it tends to show the practice of ventilating traps to be a great mistake, we have taken some pains to inquire into the nature of the investigation and the amount of weight to be attached to the deductions.

We find, in the first place, that Mr. Rice was not known by the Boston Board of Health to have taken part in the investigation at all, nor did this board employ Mr. Putnam for that purpose. The idea originated apparently with Mr. Putnam, who, it seems, had invented and patented a new device for a trap, and wished to test its merits as compared with other traps. He therefore applied to the Boston Board of Health, stating that he wished to make such experiments, but without mentioning that he had a patent of his own, and asked for aid in defraying the expense of the necessary apparatus, etc. The board, wishing to make certain tests as to the efficiency of the "bottle" or "pot" trap, offered aid to a limited extent, for the sake of getting further information on this particular subject, and no other. But the board, not being personally acquainted with Mr. Putnam, told him the experiments must all be conducted in the presence of Mr. Philbrick and Mr. Bowditch.

These gentlemen were therefore notified, and were present at a portion of the tests. But after the first test, which they witnessed, they were convinced that the apparatus used was not a fair type of ordinary good practice, and so informed Mr. Putnam. Mr. Philbrick also wrote him under date of January 18, 1884, as follows:

"It seems to me that it is a very plain case that there is no practicable risk of having your new trap, or either of the larger sizes of the 'bottle' trap, lose their water-seal by syphon-action; while new and clean, in any condition which they are likely to be subjected to in actual use. This being admitted, it does not seem to me of any use or of interest to the public in any way to continue the experiments in that line. In short, since we do not regard the loss of water-seal in these traps, when clean, as their *weak* point, why trouble ourselves any more on such remote possibilities? Neither do I think it possible, by any series of laboratory tests, to develop the weak points in this class of traps, because I consider that weak point to be their liability to collect filth, with the several evils indirectly arising from such results."

* * * * *

"I think, however, that the loss of trap-water by evaporation is an important subject for investigation, and will try to get up a 'programme' for that with Mr. Bowditch, as requested.

"Signed, EDW. S. PHILBRICK."

It seems that such a "programme" was submitted to Mr. Putnam, as he had requested these

gentlemen to do, and that he did not comply with it, but conducted the evaporation tests in his own way; this way being, in the opinion of Mr. Philbrick and Mr. Bowditch, an unfair type of good practice, making the experiments of very little value.

The "report to the Boston Board of Health" was submitted to Mr. Philbrick and Mr. Bowditch, with the request that they should sign it, which they declined to do, for the reason that they considered his deductions were not warranted by the results. It was therefore submitted with Mr. Rice's signature, first being informally sent to the chairman for suggestions. The chairman of the board was surprised to find that the report presented in a prominent manner the patent trap of Mr. Putnam, of which he had never heard when agreeing to assist him with money, and advised Mr. Putnam, as Mr. Bowditch had already done, to omit all mention of that device. This suggestion was not adopted, however.

Now, while Mr. Putnam is respected, so far as we can learn, as an honest and upright man, we regret that such an investigation, which might, in the hands of a man without the bias of self-interest, have produced results of more value, should have been committed to any one who had an axe to grind for himself in the same connection. This certainly would not have happened if the Board of Health had understood the fact that Mr. Putnam had a patent trap which he wished to test and bring into notice.

The deductions of Mr. Putnam concerning the inefficiency of ordinary ventilated S-traps to resist the loss of water by syphon-action seem to be vitiated by the fact that the apparatus he employed does not fairly represent ordinary practice. At least, if such forms of apparatus should occur in practice, the results which Mr. Putnam based his deductions upon would be entirely avoided by such a modification of that apparatus as could easily be effected without increase of cost to the owner of the building. In short, the peculiar combination which produced the results which Mr. Putnam records are not required by economy or other reasons of importance.

This combination is as follows: A vertical soil-pipe over 70 feet in height, without crook or offset to break the fall, near the top of which a plunger water-closet was attached, having a charge of $4\frac{1}{2}$ gallons of water. Some 40 feet below this point a $4\frac{1}{2}$ " Y-branch was inserted in the vertical column, the hub of which was capped, and in this cap a $1\frac{1}{2}$ -inch waste-pipe was inserted, to the end of which the traps to be tested were successively applied. The fall of $4\frac{1}{2}$ gallons of water liberated on the upper floor by the discharge of the plunger-closet, coming down the vertical pipe as a solid piston seven feet in length, or longer if somewhat scattered, passed this Y-branch with such a high velocity that a considerable vacuum was produced therein; so considerable that the water-seal was broken in a $1\frac{1}{4}$ -inch S-trap after three successive discharges of the closet above, though the trap was provided with a $1\frac{1}{4}$ -inch vent-pipe 17 feet long.

A single discharge of the same closet while the bath-tub waste was running on the same upper floor broke the seal of the same trap when the same vent was attached.

Other experiments of a similar nature demonstrate that the vent-pipe was quite inadequate to protect the water-seal of such traps under such circumstances. But we contend that the

discharge of $4\frac{1}{2}$ gallons of water at once by the lifting of a 4-inch plunger at the head of such a long vertical soil-pipe is an unnecessary waste of water which can serve no useful purpose. It has been accepted by all good authorities in this country, as well as in England, that a charge of three gallons is sufficient for the cleansing of any properly constructed water-closet.

If any town has such an abundance of water as to supply willingly $4\frac{1}{2}$ gallons for each use of a water-closet, these experiments show that the plumber who supplies such closets should see that special safeguards are applied to prevent the syphonage of traps on some floor below; but such discharges are neither necessary nor advisable, for any good reason that we can conceive.

But this is not all. The waste-pipe to which Mr. Putnam affixed the traps in question were not coupled to the vertical soil-pipe by the usual method. The wastes were only $1\frac{1}{4}$ and $1\frac{1}{2}$ inches in diameter, such as are ordinarily connected to 4-inch iron pipes by $4"x2"$ Y-branches, while Mr. Putnam used a $4"x4"$ Y-branch, capped, in which cap the small waste was inserted. This peculiar joint increased the syphoning power of the passing column of water some four-fold, if not more, above what it would have been with a $4"x2"$ Y. The power of the charge falling in the vertical pipe to disturb the water in any trap attached to a branch past which it rushes, depends on the following elements: 1st, The volume of water passing such branch orifice; 2d, Its velocity; 3d, The size of the side opening or branch where joining the vertical limb; 4th, The cubic capacity of the branch itself below the trap-water. The first two elements no one will dispute, but Mr. Putnam seems to question or overlook the last two. It is evident to any one who has watched such an apparatus in operation that the power to disturb the water in a trap on a branch-waste in such cases arises, not from the vacuum in the vertical pipe above the falling water, for the effect is made manifest before this mass of water, seven feet or more in length, has completely passed the opening, and before time has elapsed to establish communication between the air in the branch-waste and that above the falling charge of water. The effect is certainly due to the air which was previously in the branch being forcibly *torn* along by the water which rushes past it. This sort of action is certainly just in proportion to the size of the side opening in the vertical pipe, and this is four times as large in a $4"x4"$ Y as it is in a $4"x2"$ Y. But the amount of disturbance of the trap-water depends not only on the degree of vacuum produced below it, but also on the volume or cubic capacity of the chamber in which such vacuum exists—i. e., on the quantity of air which it is necessary to force through the trap to supply the vacuum and establish an equilibrium. It is plain that if a vacuum of one-half an atmosphere, or any other definite degree, were produced in a 4-inch pipe of a certain length, it will require four times as much air to supply that vacuum as it would one of the same degree in a 2-inch pipe of the same length. So we have not only four times as much degree of vacuum as need be, but this existing throughout four times as large a space as need be, merely by means of this needlessly large orifice in the side of the vertical waste-pipe.

These experiments, if of no other value, are certainly useful to warn plumbers against using such combinations. If for any good reason a branch-waste as large as four inches is connected to the main pipe, the branch should be extended to the open air of the same size, and if this had been done Mr. Putnam would, we think, have found the trap-water undisturbed.

These needless and unusual combinations serve also to vitiate the experiments on back-pressure.

The experiments on the evaporation of the water in traps would have been of much more value if conducted under conditions such as are commonly found; but since they were, as we understand it, performed with flues artificially

heated, or through pipes subjected to the influence of heated apartments in a manner not commonly done, and quite unnecessary, these experiments seem to be of little value except to guard plumbers against such appliances as may create such needless draughts of warm air over the trapping water, and to supply a deeper seal in cases where such draughts are likely to occur.

It is stated by Mr. Putnam in describing the conditions under which these experiments on evaporation were tried, that "the entire length of the soil-pipe was kept much of the time wet during the experiments on evaporation by discharges through it made for the tests on syphonage and back-pressure, precaution being of course taken by closing the inlet end of the trap against loss of its seal through these agencies," etc. It would be of interest in this connection to know how perfectly the "inlet ends of the trap" were closed against the admission of air. If much air was confined between such plug and the trap-water, the expansion of this confined air when the vacuum occurred below would account for a part of the loss of trap-water which was attributed to evaporation, and a very slight leakage of air through or around the plug would restore the normal pressure by degrees to the air so confined, so that it would be ready to expand again when the vacuum was repeated. The somewhat extraordinary degree of vacuum produced by a solid column of water seven feet or more in length when falling in a straight vertical pipe for thirty or forty feet, and passing an opening as large as the vertical pipe itself, is very much greater than the vacuum to be found in that vertical pipe above the falling water, and is so great as to tend to expand to no slight degree any such air as may be confined in connecting-chambers.

The criticisms we have made tend to show the importance of having all investigations of natural laws conducted by thoroughly educated physicists, who are quite independent of the bias of self interest, for however candid a man may try to be, human nature is known to be too fallible and nature's laws too obscure to be fathomed by any but the most independent investigators.

THE DISINFECTION OF MAIL MATTER.

In a recent number of the *Archiv für Hygiene*, Pettenkofer gives the substance of a report which he lately made to the Bavarian Government on the advisability of disinfecting the East Indian mail as a safeguard against cholera. He asserts that even if the mail matter carried infection with it, the means now employed are utterly inadequate and useless, except so far as the pierced letters and smoky appearance and odor give a sense of security to the recipient. He laughs at the tarred sack, and considers that the only practicable method of really killing the cholera germ would be to subject the articles to a dry heat of 212° F. until every article had acquired this temperature throughout; and this, according to the experiments of Wolffhügel, would take a very long time. He shows, however, that there is no evidence that the mail is or has been a carrier of infection, and characterizes all attempts at disinfection as "love's labor lost." He shows that if the mail contributes to the spread of cholera there should be some coincidence between the dissemination of the disease and the extension and acceleration of the postal service. It appears, however, that in spite of increased postal communication with Calcutta and Bombay, where the cholera is never extinct, Europe is not visited with cholera epidemics more often than previously, and the frequency or number of cholera cases in various parts of Europe does not coincide with the maximum in the East. Moreover, those who have to handle the mail matter and those who receive quantities of postal packets should be especially liable to infection; this is not found to be the case. Among the many cases which he mentions is that of England in 1872-74. In these years many Continental countries were visited with cholera, but, although the mail was subject to no sanitary control, England remained

free from the epidemic. He gives other instances and argument to justify his report that it was inexpedient to attempt to disinfect the Indian mail. Of course the arguments will apply equally well to mail matter coming from other regions where cholera exists.

THE MARINE ENGINEER IS NOT AN IGNORAMUS!

THE *American Engineer* of July 18 desires to make it appear that we question the ability of marine engineers in our editorial of the 26th of June on "Competitive Examination for Engineers of Office Buildings." This was not our intention, nor will it so appear to any one who will fairly examine the full text of our comments.

The attack on our article, by implication, as in the interest of any set of men, we pass in silence, but when it is made to appear that we underrate any class of engineers, we are forced to say a word in their defense, though we do not in our own.

Our position on this matter in the fewest words is: "Every man should have his specialty, and to attain the first rank in any one direction he must give nearly his whole time and attention to it." Mechanical engineering of all branches of mechanical science has the greatest number of sub-divisions. Every branch of industry that uses a tool less primitive than a stone hammer is represented. Among them come engineers who have had experience at sea and may or may not be machinists. These, of course, are the men eminently fitted to take charge of ocean steamers or lake or river steamboats. Then we may take *mine* engineers, who know more about pumps and hoisting elevators than do marine engineers, but who would be in about as deplorable a predicament *aboard ship*, if they found themselves suddenly in charge in heavy weather, as the marine engineer would be in if he were suddenly transplanted to a mine; the darkness alone being enough to demoralize him for a time, not taking into consideration a rumor that the pumps were out of order and that the water was rising at the rate of so many inches an hour.

Then there is the locomotive engineer; he began as a "wiper," then made the fires in the locomotives in the round-house, and went out on the road one day when a fireman was absent, and is now the best engineer on the road. Still, we have no doubt but he would "sand the boxes" (so long as it was only a car journal) that were hot, to the everlasting scandal of a marine engineer, and there is just the possibility that he might recommend *sand* for the propeller-shaft if he found himself on a steamer when water and oil would not keep things cool. But with all his peculiarities, he is not going to lose his head and his breath so long as he is in the "cab," whereas, the men whom the sea or darkness had no terrors for "between decks" or in the mine would be very apt to feel uncomfortable if they found themselves running fifty miles an hour with nothing more to depend upon than their general knowledge of engineering.

Undoubtedly after one year's experience in their new capacities, either would make an average engineer, though still if we were passengers on the steamer or train and were told the engineer was only under probation—simply getting his "hand in" at our risk—the knowledge would not be conducive to tranquility of mind.

The same reasoning applies to apartment-houses and office-buildings in New York. These buildings have produced a new class of engineers, who justly may be called "domestic engineers." Many of the men in charge of them have been to sea, and many have not, their abilities as general engineers being about the same. Some were expert machinists or mechanics before becoming "engineers," in the sense in which we use it, and these men as a general thing make the finest engineers, whether marine, locomotive, or stationary.

Before leaving the subject, however, we wish to impress upon our contemporary that in our former editorial we spoke from facts and an

actual knowledge of our subject as it applies to our locality. To our own knowledge the engineer now in charge of one of the largest buildings of the class under consideration was the engineer of a Hudson River steamer. He applied for the situation, and having a certificate as a "marine engineer," the owners thought he must be the best man for the place of all the applicants, though some had had charge of such a building before. This man got the appointment, and knowing his own ignorance of the equipments of such a building, went to the engineering contractors who furnished it, and employed one of their skilled mechanics to remain with him two weeks, paying for him more than his own salary for the same time.

This does not prove the man an ignoramus—rather the reverse—but all men who creep in at a cabin-window and appear on the quarterdeck as master are not furnished with a *mate* who came in through the "hause-hole" and came aft on deck.

OUR BRITISH CORRESPONDENCE.

Small-Pox Epidemic in London—Thames Water—Conference on Water-Supply—Smoke Abatement—Dinner of the Executive Council of the Health Exhibition—Talk About Cholera.

LONDON, July 19, 1884.

THE Local Government Board has directed one of its medical officers to institute an inquiry into the character of the present small-pox epidemic in London. The inquiry will commence in the districts of Fulham and Chelsea.

Dr. Frankland reports that the Thames waters delivered in June by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Water Companies were, for river-water, remarkably free from organic matter. The Lea water distributed by the New River and East London Companies contained more organic matter and more impurities than any of the Thames waters. Efforts are being made to improve the condition of the river Thames, which for some weeks past has been in a very bad state. Prior to the complaints which have recently been made in Parliament, the Metropolitan Board of Works ordered that the sewage discharged at the two great outfalls in Barking Reach should be deodorized, and sanctioned the use for this purpose of 140 tons of chloride of lime per day. As the chloride of lime costs £9 per ton, the cost of deodorizing will amount to a considerable sum.

At the conference on Water-Supply by the Society of Arts, to be held at the Health Exhibition on the 24th and 25th inst., the papers and discussions will be arranged under the following heads: 1. Sources of Supply. 2. Quality of Water, Filtration and Softening. 3. Methods of Distribution, Modes of giving Pressure, House-Fittings, Discovery and Prevention of Waste, etc. The readers of the papers will be restricted to twenty-five minutes, and the speakers will have ten minutes each. Most of the papers to be read will be printed and distributed in the room.

At a public meeting held at the Mansion House on the 15th inst., with respect to the question of smoke abatement, it was stated that smoke-preventing appliances were being widely adopted with satisfactory results by bakers, glass-stainers, confectioners, restaurant-keepers, coke manufacturers, and other traders, with evident advantage to themselves and the community. Lord Mount Temple, the chairman of the meeting, stated that London could be made the best residential city in Europe if only we could get rid of the smoke. A Smoke-Nuisance Abatement Bill has recently been introduced into Parliament, but the prospects of its passing during the present session are very remote.

The Lord Mayor entertained the Executive Council and Commissioners of the Health Exhibition at dinner at the Mansion House last Saturday. In replying to the toast of the "Executive Council of the Exhibition," Sir T. Paget, the Vice-President, said the evidence of the success of the exhibition, so far as numbers went, was plainly apparent, for up to that day 1,150,000 persons had visited the exhibition, a great increase over the number of visitors at the Fisheries Exhibition last year during the like period. So far as the question of health was concerned, Sir T. Paget said the success would not be apparent immediately. They must look thirty years hence to see what effect had been

made in teaching the people what were the best means of securing health. The true and final success of the exhibition depended very much upon the commissioners and jurors, for it was they who were to put their mark of excellence upon the exhibits.

The cholera forms an important subject of conversation and of newspaper articles, and if it comes we fear that the way is being prepared for a harvest of victims among nervous people. There are, of course, two ways of looking at the matter. Professor Tyndall, presiding at a lecture given by Dr. George V. Poore on "Thrift in its Relation to Health," considered it a good thing that the people were being educated by the press and by the conferences and lectures of the Health Exhibition, and expressed the opinion that if the cholera came it would be met in a much more sensible manner than it has been on the Continent.

The Local Government Board has called the attention of the local sanitary authorities to the powers which they possess in respect to the detection and prosecution of adulterations, and has asked for the more efficient increase of their authority.

The City Commissioners of Sewers have resolved "in all instances where new houses are being erected to place themselves in communication with the builder or owner of the property, and treat with him or them for the construction of a proper ventilating-shaft in the chimney-breasts or party or other walls for the purpose of ventilating the sewers, carrying the ventilating-shafts well above the adjoining roofs." These ventilating-shafts are intended to take the place of the openings in the middle of the street, and thus prevent the entrance of foul air into the neighboring houses.

SAFETY-VALVE.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. V.

(Continued from page 192.)

THE illustration, Fig. 13, is a view in the clothes-drying room of the Marquand house, with one of the clothes-horses drawn out.

There are eight horses, eight feet long and eight feet high, each provided with eight wooden bars to hang the clothes on, instead of the conventional wire. The bars are in pairs, as shown, and are rounded on the top edges to hang the clothes over. They are made of 2"x6" whitewood, and are mortised into the front and back boards and fastened with rail-bolts, the nuts being embedded in the bars. No bracing is used, the number and depth of the bars being sufficient to prevent swaying.

The frame and track overhead, on which the wheels of the horses run, is 4"x4" ash, and is suspended from the ceiling by bolts screwed into the joists. At the centre each scantling is supported by the fixed jamb between the horses, and against which the horses close. The jambs and panels are ash and the handle bronze. Figure 14 is a detail of the manner of hanging the horses; *b b* are a pair of the 4"x4" scantlings which form the tracks, *a* is the front or back of a horse, and *c* are the wheels of cast-iron. On the scantlings no iron is used, and rubber bands are to be sprung over the wheels to prevent noise.

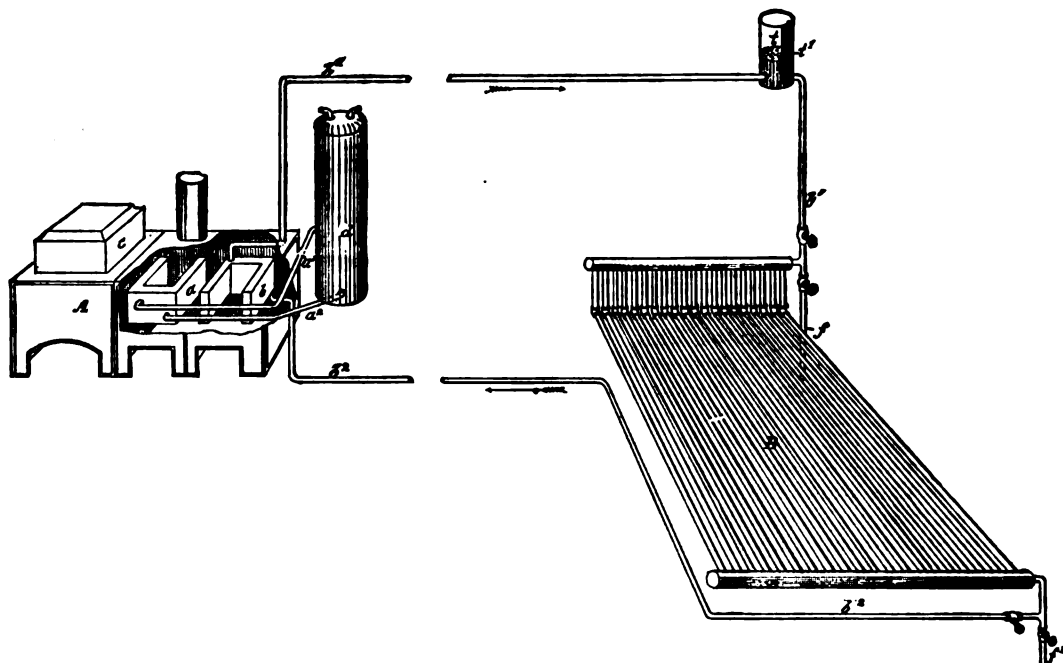


FIGURE 15.—DETAIL OF TWO WATER-BACKS IN LAUNDRY RANGE.

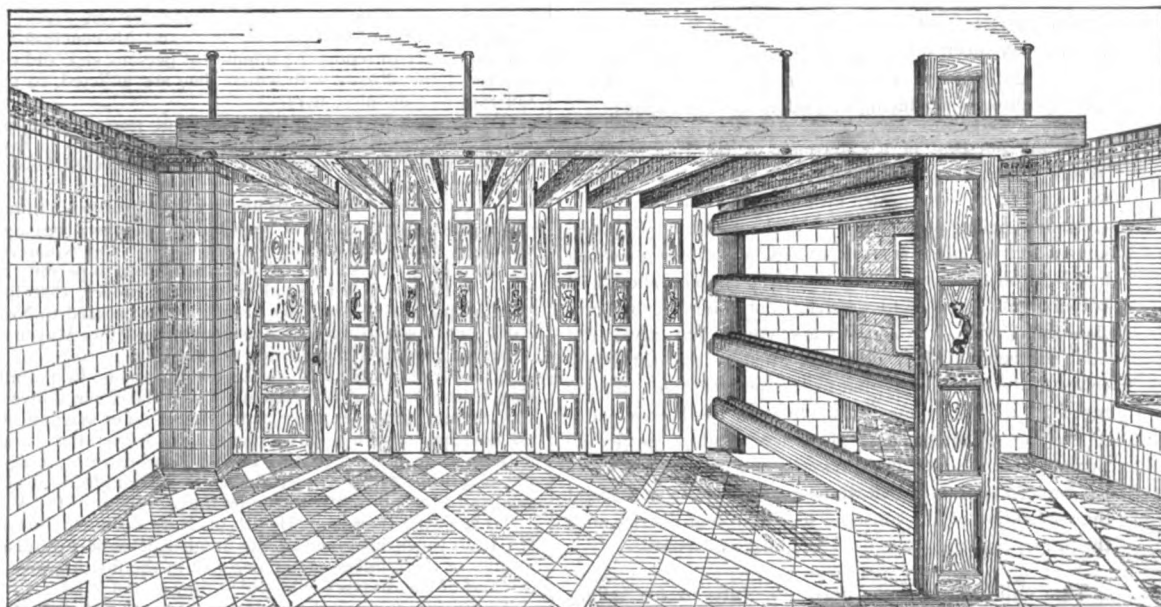


FIGURE 13.—VIEW IN CLOTHES DRYING-ROOM OF THE MARQUAND HOUSE.

The ventilation is from the upper part of the drying-chamber, through a brick flue of one and one-half square feet of cross-section, which extends direct to the roof, the air entering at the feet of the horses under the heating-coil.

Figure 15 is a detail of the two water-backs in the laundry-range shown in Fig. 10, page 193, and their relation to the hot-water boiler and the drying-room coils. The water-back *a* surrounds the first fire-place of the range, and connects with the domestic boiler by the circulating-pipes *a*¹ and *a*². The water-back *b* surrounds the second fire-place, and connects with the hot-water coil B by the pipes *b*¹ and *b*². This arrangement is to provide for warming the drying-

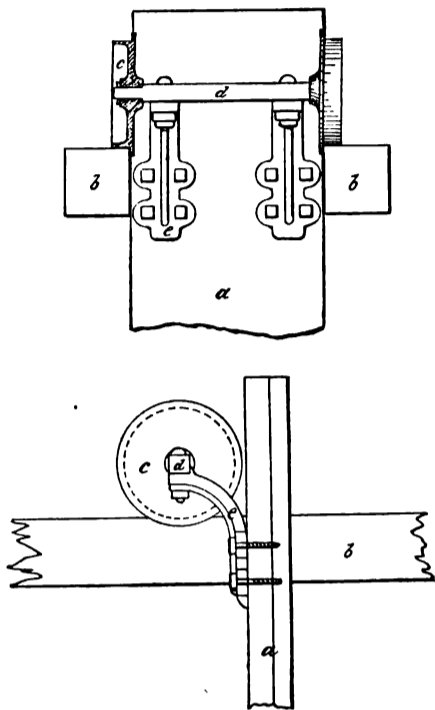


FIG. 14.—DETAIL OF MANNER OF HANGING HORSES IN DRYING-ROOM.

room coil in the summer time, or when there is no steam in the boiler. It is in substance a low-pressure hot-water apparatus, with an open expansion-chamber at *t*. The arrows show the direction of the circulation of the water when it is used as a water-apparatus. To convert it into a steam-apparatus, the valves in the pipes *b*¹ and *b*² are closed, and those on the pipes *f* and *f*¹ are opened. This allows the water in the coil to run through the pipe *f*¹ into the return-pipes of the regular steam-heating apparatus of the house and the steam-circulation to go on through the pipes *f* and *f*¹, the former being the steam-supply.

The warming engineers of this building are Messrs. Bramhall, Deane & Co., of 274 Front Street, New York.

(TO BE CONTINUED.)

THE water from the coal mines along the Youghheogeny River, in Pennsylvania, is poisoning that river, into which it flows, and the fish are dying in great numbers. Their decomposition is producing foul odors along its banks.

By the bursting of a water-main of the East London Water Works Company, on June 28, the roadway of Clapton High Road was thrown up with great force, and concrete and paving-stones shattered the windows of several houses and wounded several persons, and threw a passing horse-car off the track. This company supplies about 48,000,000 gallons a day to a district containing nearly a million inhabitants. Its reservoirs cover 220 acres and hold 720,000,000 U. S. gallons. Most of the district receives a constant supply, but in one portion the company reports that "the greatest disinclination has been evinced on the part of consumers and owners to adopt proper fittings to meet the increased pressure, and the waste of water has been so enormous that we have had literally to suspend the application of the constant service in that district until the proper remedies have been established."

TEN milk-dealers were fined on July 19 for selling skimmed and watered milk in Brooklyn. Three hundred and one dollars in fines were received.

THE QUARANTINE DEFENSES OF NEW YORK.

A MARITIME quarantine for the protection of the public health of New York was established as early as the year 1758, but it is under the General Quarantine Act of April 29, 1863, and its subsequent amendments, that the present quarantine is administered. The quarantine establishment consists (1st) of an outer boarding-station—a ship at anchor in the lower bay, five and one-half miles from the Narrows and twelve and one-half miles from the Battery, or the extreme lower end of Manhattan Island; (2d) an outer quarantine roadstead in the lower bay about one mile inside the outer boarding-station; (3d) an artificial island (Swainburn's Hospital Island) containing ten detached hospital buildings, two and one-quarter miles outside the Narrows; (4th) Hoffman Island, one mile nearer the Narrows, and an "observation station" containing buildings for the accommodation and observation of 1,500 persons; (5th) the upper quarantine roadstead, just inside the Narrows, and the regular boarding-station, the year round, for all vessels, and where the affairs of quarantine are administered, including residences for officers and men, about one mile south of Clifton Landing; and (6th) Robbins' Reef Anchorage, where infected vessels are discharged and cleansed.

The affairs of quarantine are administered by a quarantine commission of three members and the Health Officer of the Port, appointed by the Governor and confirmed by the Senate, and the Mayors of New York City and Brooklyn are *ex-officio* members of the commission.

The Health Officer, under the law, must be a doctor of medicine in good standing, with ten years' experience in the practice of his profession, and be practically familiar with the diseases subject to quarantine. His duties are the general superintendence and control of quarantine, and the care and treatment of the sick, and the carrying out of all the provisions of the law and regulations. He has power to administer oaths and take affidavits. He can at all times call upon the metropolitan police to the number of ten to aid him in an emergency to enforce the duties conferred upon him, or to direct in writing any constable, or even citizen, to pursue and apprehend any person violating quarantine law or regulations, and can detain such persons ten days. A person obstructing the Health Officer is guilty of a misdemeanor punishable by a fine not less than one hundred nor more than five hundred dollars, or by imprisonment from three to six months. He has power to appoint or dismiss at pleasure all employees under himself, and, in conjunction with the Quarantine Commissioners, to license lightermen, stevedores, and as many other as may be found necessary for the care and purification of vessels, merchandise, baggage, etc. The law provides for two Deputy Health Officers, whom he appoints and whom he is directly responsible for, and who are authorized to perform all the duties in his absence. The Health Officer, his deputies and assistants take an oath of office. His prescribed duties are:

To board every vessel subject to quarantine or visitation by him, as soon as practicable after her arrival; to inquire as to the health of all persons on board, and the condition of the vessel and cargo, by inspection of the bill of health, manifest, log-book, or otherwise; to examine, on oath, as many and such persons on board as he may judge expedient to enable him to determine the period of quarantine and the regulations to which such vessel and her cargo shall be made subject; and to report the facts and his conclusions, and especially to report the number of persons sick and the nature of the disease with which they are afflicted, to the Quarantine Commissioners.

To exercise dispatch in the disposal of persons arriving in infected vessels; to have the bodies of persons who have died of malignant diseases on board of infected vessels arriving, and such as shall have died in the hospital, interred in the quarantine burying-ground; and to proceed, without delay, in the purification of vessels, merchandise, baggage, dunnage, and other articles in quarantine; and whenever he shall judge the same free from infection, to permit the removal thereof. No vessel or cargo, however, that has been in quarantine, shall be permitted to proceed to New York or Brooklyn without the approval of the Mayor or Board of Health of those cities respectively.

To secure the effects of the deceased persons, in quarantine, from waste and embezzlement, and make a true inventory thereof, and when the rightful claimants of such effects do not appear within three months, to deliver the same, with such inventory, to the Public Administrator, unless the said property be of such description as ought not to be removed or may be destroyed under the provisions of the Act.

To keep the Boards of Health of New York and Brooklyn at all times informed of the number of vessels in quarantine, of the number of persons sick in the floating hospital, and of the diseases with which they are afflicted.

To receive any vessel or merchandise sent to him by the health authorities of New York or Brooklyn, dangerous to the public health.

To receive into the floating hospital any case of yellow fever that shall have been contracted in quarantine establishment or elsewhere.

To have all vessels, warehouses, and merchandise in quarantine designated by a yellow flag; and to prohibit communication with, or passage within range of, such vessels and places, except under such restrictions as he may designate as being compatible with safety.

Whenever the Health Officer, in the performance of his duties, and in the execution of the powers imposed and conferred upon him by law, or by any regulation or ordinance made in pursuance of any statute of this State, shall order or direct the master, owner, or consignee of any vessel subject to quarantine to do any act or thing, or to comply with any regulation, relative to said vessel, or to any person or thing on board thereof, and said master, owner, or consignee shall neglect or refuse to comply with such order or direction, the said Health Officer shall have power to employ such persons and assistance as may be necessary to carry out and enforce such order and direction, and the persons so employed shall have a lien on such vessel, her tackle, apparel and furniture, for their services and expenses.

Vessels arriving at the port of New York are to be subject to quarantine as follows: All vessels from infected ports, or which shall have arrived at any such place, and proceeded thence to New York, or on board of which during the voyage any case of such disease shall have occurred, or vessels from any place (including islands) in Asia, Africa, or the Mediterranean, or from any of the West Indies, Bahama, Bermuda, or Western Islands, or from any place in America, in the ordinary passage from which they pass south of Cape Henlopen.

WHAT DISEASES ARE QUARANTINABLE.

The only diseases against which quarantine applies are, yellow fever, cholera, typhus or ship fever, and small-pox, or any disease not now known, of a contagious, infectious or pestilential nature.

Merchandises subject to quarantine are: (1) Clothing, personal baggage, dunnage, rags, paper-rags, hides, skins, feathers, hair, and all other remains of animals, cotton-hemp and woollens, on which quarantine is obligatory. (2) Sugars, silks, linen, and cattle, on which it is optional.

The law provides that the Commissioners of Emigration shall receive into their hospitals all alien passengers arriving at the port of New York who shall be affected with any contagious or infectious disease other than yellow fever. For this reason small-pox patients are sent to Blackwell's Island, and typhus or ship fever patients to Ward's Island; the cholera or yellow fever patients to be taken care of by the Commissioners of Quarantine, at their hospitals on Swainburn's Island.

Of the duties of pilots in relation to vessels subject to quarantine, the law requires that a pilot must use his utmost endeavors to hail every vessel he shall discover entering the port, and to interrogate the master in reference to all matters necessary to enable him to determine whether such vessel is subject to quarantine, and he has the power to order the master to proceed to the anchorage in the lower bay, if quarantinable diseases are found on board.

The routine of quarantine, in brief, is—vessels from infected ports are brought by the pilot to the lower boarding-station. The Deputy Health Officer there examines her, transferring the sick (if any) to Swainburn's Island, and those that have been exposed to Hoffman Island until after the period of incubation of the disease is passed, where their clothes and persons are washed, and what will not wash fumigated. Vessels from England, or from presumably healthy ports, pass to the upper boarding-station, where they are examined and allowed to pass, or returned to the lower grounds, as the case demands.

If, in the judgment of the Health Officer, the vessel requires it, he may order the following sanitary measures: Baths and other bodily care for the person; washing or other disinfecting means for clothing; displacement of merchandise on board, or complete breaking out of the vessel; subjection to high steam, incineration, or submersion at a distance below the surface of the water, for infected articles; the destruction of tainted or spoiled food or beverages; the complete ejection of water; thorough cleansing of the hold, and the disinfection of the well. In short, the complete purification of the vessel in all her parts, by the use of steam, fumigation, force-pumps, rubbing or scraping, and saturation with a solution of sulphate of iron, and finally sending to quarantine anchorage until disinfection be perfected. Whenever these operations are necessary, they shall always be executed before admission to pratique.

Persons with insufficient evidence of vaccination are not allowed to proceed until they are vaccinated.

WE cannot answer "Apprentice," of Jersey City, until we receive his name and address.

A STAGNANT pool in the central part of the village of Fairport, New York, has become a public nuisance, and the Village Trustees have appealed to the State Board of Health for its abatement.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XI.

(Continued from page 196.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

SOUTH GALLERY—FOODS, ETC.

No. 194. The Science and Art Department, South Kensington, contributes from the Bethnal Green Branch Museum a very neatly arranged collection of diagrams and specimens to illustrate the chemistry and physiology of foods. Printed statements of the chemical constituents of the more common articles of food are accompanied by specimens which appeal to the eye. Thus, in the case of the common ground-nut, for example, there is a statement of the botanical name, of the habitat and manner of growth, and of the uses to which the nut and certain derived products are put; then, besides a tabulated statement of the proximate constituents, there is shown a tray containing one pound of the kernels, and by its side, in bottles or trays, the proper respective amount of these constituents.

1 oz.....	87 grains of water.
3 ".....	403 " casein.
8 ".....	0 " oil.
1 ".....	382 " starch.
0 ".....	315 " lignose and cellulose.
0 ".....	126 " mineral matter.

Statements then follow as to the comparative value of the nuts as articles of food.

No. 205. The Parkes Museum of Hygiene, 74a Margaret Street, Regent Street, W.

A description of the objects for which this museum was founded has already been given in THE SANITARY ENGINEER. (See Vol. IX., page 53.) The exhibit here made covers but a limited space and serves to the visitor merely as a hint of the objects which come within the scope of the institution, and of the methods of display and arrangement adopted in the museum.

No. 141. The Salutaris Water Company, 236 Fulham Road, S. W., exhibits under the name *salutaris* what is claimed to be pure distilled water. It also supplies the same charged with carbonic-acid, what we call in America soda-water, also various sweetened drinks, lemonade, etc., made with pure distilled water. Much more attention than formerly is now being given to the character of the water used for such purposes in England as well as in the United States.

EAST AND WEST QUADRANTS—HYGIENE.

The east and west quadrants are usually thronged with visitors, for it is these galleries which are devoted to the display of all sorts of clothing, of ancient and modern costumes, and to various processes of manufacture of articles of dress. The west quadrant contains a large collection of lay figures, male and female, robed in the costumes worn by various classes of society in England from 1066 to 1820. The arrangement is chronological, and in some cases the artisan and the upper classes are both represented. Another series of figures shows the various changes which have taken place in the uniform of the British army from the earliest times to the present day. In the same quadrant Messrs. John Richardson & Co., Leicester, exhibit a series of costumes, lace curtains, etc., which they claim have been made non-inflammable by chemical treatment. They also exhibit chemically-prepared starch for use in the laundry, to render garments non-inflammable; also, specimens of various chemicals—sulphate of ammonia, tungstate of soda, phosphate of soda—used in the process.

Messrs. Wheeler & Co., 16 and 17 Poultry, E. C., exhibit various articles of underclothing, arranged to illustrate their relative warmth. A number of torsos clad in undervests of different materials are provided with imitation thermometers filled with a colored liquid. Calling the amount of heat lost in a certain time by a naked body 100, the height of the column of colored liquid indicates on a scale the amount of heat retained by the material in question. They also show three woolen wrappers suspended from imitation balances, which indicate, by the apparent increase of weight, the amount of moisture absorbed by the garment in a moist atmosphere and on exposure to rain. This is also shown by bottles containing the actual amount of water which would be absorbed by the said garments under the given circumstances.

EASTERN CENTRAL GALLERY B—MATERIALS OF SANITARY WORK.

The Cadogan Iron Company, Kings Road, Chelsea, London (Stand No. 455), has various cast-iron fittings, included in which is an iron trap enlarged at the upper part, and made square, with a recess to hold a grating, such as is placed in areas. It also exhibits Pocock's water-meter.

Le Grand & Sutcliff, 100 Bunhill Row, London (Stand No. 458), exhibit their iron pumps and machinery for putting down drive-wells.

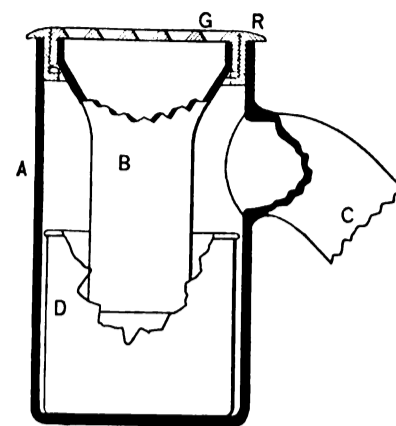
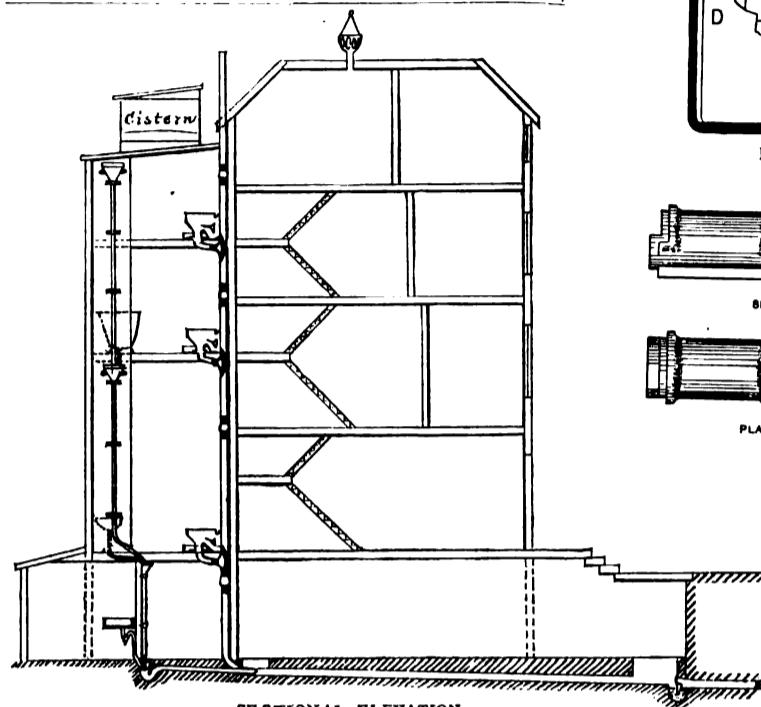


FIGURE 2.

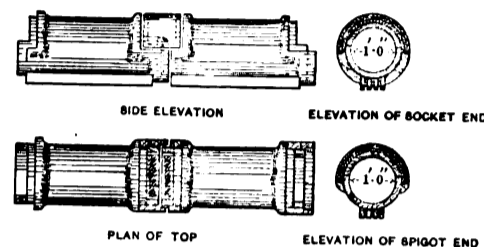


FIGURE 3.

exhibit of bathing appliances and their various specialties. Among these we notice two very attractively enameled baths.

James Allen, Marylebone Lane, London (stand No. 970), exhibits a great variety of portable hot-water heaters, etc., for invalids.

Ewart & Co., Euston Road, London, N. W. (stand No. 938), exhibit various portable hot-water

boilers, also a spray and shower-bath, and what the ladies would call a "cunning" little spray and shower-bath for children.

The Wortley Fire-Clay Co., Leeds, Eng. (stand No. 842), show a variety of colored glazed bricks and bricks ornamented to represent tiles for borders, etc.

SOUTH CENTRAL GALLERY.

Mineral Baths.

The corporation of the city of Bath exhibits models (No. 402) to show the establishment of baths connected with the principal spring of these long-utilized mineral waters. The springs were well known to the Romans, and the models show the extensive remains of buildings, dating probably back to the time of Hadrian (A. D. 117-138), a portion of which have been only recently uncovered, and which form only a part of the remains underlying modern buildings. A sectional model of the King's bath-spring is given. The spring, which yields 167 gallons a minute, at a temperature of 116° F., flows into an octagonal well fifty feet in length by forty feet in width, from which it is still drawn for drinking in the pump-room, and from which it is also delivered by pipes to various baths. The walls are of massive masonry, three feet thick, and were lined with lead thirty pounds to the foot. The surplus water ascends through a shaft in the centre, and overflows into the King's bath above, where it maintains the temperature at from 98° to 110° F.

The model of the King's and Queen's bath represents the bathing establishment of the seventeenth century, and other models show some of the present baths. Specimens of the old leaden lining of the tanks, of the leaden conduits, a number of coins, pottery and metal vases, fragments of glass, and other antiquities found in the old Roman baths, are shown in side-cases, and paintings of persons and photographs of the ancient and modern buildings adorn the walls. The present daily yield of all the springs is 385,000 imperial gallons, at a temperature of from 117° to 120° F.

EASTERN ANNEX—PLUMBING APPARATUS.

Stand No. 508 is the tastefully fitted-up exhibit of the Hygienic and Sanitary Engineering Co., Limited, of 23 and 24 Charing Cross, London. These exhibitors show Bostel's water-closets and the various specialties of Daniel T. Bostel. The feature attracting our attention was a neatly gotten-up half-circle glass-wall urinal, flushed from

Quirk, Barton & Co., 61 Gracechurch Street, London (Stand No. 462), exhibit tin-lined lead pipes and tin-lined sheet-lead for lining cisterns.

R. Anderson & Co., Duke Street, Liverpool, Eng., (Stand No. 459), are exhibitors of their plumbers' brass goods manufactures; also of copper range-boilers, pumps, etc.

The Reliance Water-Apparatus Company, 63 Queen Victoria Street (Stand No. 447), exhibits valve-supply for water-closets.

George Homewood, Cuckfield, Sussex, Eng. (Stand No. 449), exhibits a syphon waste-preventing cistern of familiar type.

C. Isler & Co., 88 Southwark Steet, London (Stand No. 460), also exhibit machinery for driven tube-wells.

Messrs. A. Dreyfus & Co., 19 Edmund Place, Aldersgate Street, E. C., exhibit Ligny's apparatus for drying damp walls and damp plaster. A sort of stove is furnished with a number of movable smoke-pipes, and a current of hot air is forced by a hand-power fan through the pipes and against the walls to be dried. It has been used to hasten the drying of walls so that the decoration of them might be proceeded with at once.

EAST CENTRAL GALLERY.

Bathing Appliances.

Dr. Maccall (stand No. 973) shows a Turkish bath for private houses—seemingly a room heated by a gas-stove and containing a couch.

John Hall & Co., of Stourbridge, Eng. (stand No 972), exhibit a porcelain bath with a white glazed inside and marbled extension, requiring no paneling or casing; also glazed bricks in various colors and sinks prepared in the same manner as the bath.

Joseph Mountain & Son, of Sheffield, Eng., exhibit a portable combination child's bath, which consists of an oval tinned and planished copper pantry-sink, in which a small baby might be bathed or a grown-up person wash his face.

John Smeaton, Ludgate Circus, London (stand No. 939), exhibits in a room tastefully decorated a corner lavatory and combination shower, and spray bath. There is also a very creditable sectional drawing showing plumbing and hot water stated to have been carried out in certain English houses.

Shanks & Co., of Barrhead, Glasgow, N. B., and Cannon Street, London (stand No. 929), have an extensive

an automatic syphon-cistern arranged to discharge at intervals. The urinal proper is glass-faced, with concrete back; top and sides of Italian marble, and corner-pieces of Dove marble. The inclosure in which these exhibits are shown is appropriately gotten up with Scagliola marble, a material which seems to be a very proper one for bathrooms, water-closets, lavatories, etc. The accompanying illustration is of a model of a house made by a lad in the employ of this company. It is a creditable piece of work, and should interest the plumbing readers of THE SANITARY ENGINEER. This model is exhibited in the Eastern Gallery Annex. (See Fig. 1 on preceding page.)

John Bolding & Sons, of South Molton Street, London (Stand No. 439), have a most extensive and elaborate exhibit, consisting of their various sanitary specialties, plumbers' brass-work, etc. Our attention was drawn to an ordinary 4-inch bottle-trap, arranged for use as a grease-trap for sinks, etc. It consists of a main cylindrical chamber, A, to which is attached the outlet-arm C. In the top of chamber A is soldered a flanged brass rim, R, threaded on the inside to receive a screwed brass grate, G. To the underside of grate G is attached the inlet dip-pipe B, the upper end of which is of conical shape. A can or cup, D, is placed inside the chamber A to intercept grease or other foreign matters. On unscrewing the grate G with its attached dip-pipe B, the cup can be removed and the whole inside of the trap is accessible for cleaning. (See Fig. 2 on preceding page.)

They also exhibit quite an assortment of fine lavatory cabinet-work. We noted a washstand in which the marble slab was covered with walnut top and casing. Inside the lid, when raised for use, was a mirror and two walnut drawers, on either side of hot, cold, and waste handles. Closed, it looked an ordinary piece of furniture. There is also an upholstered walnut chair water-closet for invalids' use, etc., with a cistern holding six gallons of water, flush being produced by pressing a button. In the water companies' pavilion Messrs. Bolding further show their various water-fittings, and a fitted-up enameled-iron bath, showing also a section of house-drain laid in trench-wall with glazed-brick, with channel-bed and inspection-chamber, offering facilities for access to remove obstructions.

Stands Nos. 507 and 508 is the exhibit conjointly of Henry Jones, Sharp & Co., of Bourne Valley Works, Poole, Dorset, Eng., and their London agents, Bowes, Scott & Read, of Broadway Chambers, London, engineers and contractors, and agents in England for Rogers Fields' flush-tank. They exhibit concrete pipes, earthen grease-traps, trough-urinals, and various adaptations of Fields' flush-tanks, also a section of Boulnois & Hilder's patent drain-pipe, of which we append a sketch. (See Fig. 3 on preceding page.)

CONSUMPTION OF FUEL IN LOCOMOTIVES.

In a paper read by M. Georges Marie, engineer of the Paris and Lyons Railway, before the Institution of Mechanical Engineers, he says: "There is a general impression that locomotives consume as much as from $4\frac{1}{2}$ to $5\frac{1}{2}$ pounds of fuel per horse-power per hour." But with a view to dispelling this very prevalent error, the author quotes experiments made by himself during the last few years, which go to show an average consumption in good locomotives of 3.35 pounds, when the *horse-power* is measured by the work done at the circumference of the driving-wheels, and of 2.91 pounds when it is measured by the indicator diagrams, the fuel being of good quality and the firing done with care.

Comparing this with marine-engine consumption of two pounds per *indicated horse-power*, it seems that locomotives are much more economical than is usually supposed, considering that they work non-condensing, while marine-engines enjoy the great advantage of condensation.

NEW ZEALAND ADULTERATION ACT.

THE General Assembly of New Zealand has amended its food-adulteration act. The definition of adulteration in the cases of food and drugs is substantially the same as given in the Adulteration Act of this State. The standard for milk is 9 per cent. of solids not fat, and 2.5 per cent. of fat. Butter shall contain not less than 80 per cent. of butter-fat. Tea shall contain not more than 8 per cent. of ash, calculated on the dried tea, and of this amount at least 3 per cent. shall be soluble in water. Cocoa shall contain at least 20 per cent. of cocoa-fat, and vinegar shall contain not less than 3 per cent. of acetic-acid. The law also requires that bread shall be made up into two, four, six, or eight-pound loaves, and that each loaf shall be stamped with the weight and the initials of the baker's name.

IRON AS A MATERIAL FOR PURIFYING POTABLE WATER.

BY PROF. WILLIAM RIPLEY NICHOLS.

SCARCELY anywhere in Europe would a surface-water be suggested for a public supply unless it were to be filtered through sand as efficiently as possible before being delivered to the consumers. In this country the artificial filtration of water on the large scale necessary for town-supply is almost unknown, and surface-waters—unfiltered—are very commonly employed.

The reason for this difference in practice is usually stated to be the cost of filtration and the difficulties arising from our hot summers, and, in the Northern States, from our cold winters. Personally, however, I have been deterred from strongly advocating filtration in general and from advising its adoption in cases where I have been consulted, not by the cost *per se*—because the best water practicable should be had even at considerable expense—nor by the difficulties of climate, which can be overcome. I have been influenced by the fact that the experiments of myself and others, and the experience of existing works have convinced me that it is impossible by sand-filtration to remove the color which generally affects our surface waters, and the disagreeable tastes and odors to which they are at times liable. Sand-filtration, *carefully conducted*, can improve the water, but in a particular case, it may be very doubtful whether the improvement is worth the necessary outlay, especially if the filtration is likely to be unsatisfactory at the very season of the year when it is most necessary.

On account of the deficiencies of sand-filtration on the large scale, attempts have frequently been made to employ other means, and the attempt made in connection with the water-works of Antwerp to use "spongy iron" as a filtering material is one which has excited a great deal of interest. A full description of the works has been published by the engineer, Mr. William Anderson, M. Inst. C. E., in the Proceedings of the Institution of Civil Engineers. (Vol. LXXII., 1882-3, Part II.) A description has also appeared in *Engineering*, and a briefer account in THE SANITARY ENGINEER, Vol. VI., page 421. A recent visit to Antwerp has given me the opportunity of learning certain facts with reference to the use of the spongy iron, which may be of interest and of service to water engineers.

There is no doubt whatever of the purifying effect of metallic iron on impure water, as was shown by Medlock nearly thirty years ago, and more recently by Bischof, Frankland, and others. The difficulty has been to make practical application of the fact.

Briefly stated, the method introduced at Antwerp consisted in employing filter-beds of the ordinary construction—except that they were filled with spongy iron covered with sand—and in subsequently passing the water through ordinary sand-filters. While the water after this treatment was satisfactory in character, the difficulties attending the use of the spongy iron in this form were very great. Clogging of the filters took place, not merely on the surface of the sand, but also at the surface of the iron, necessitating the frequent removal of the sand and the stirring up of the top portion of the iron. This necessity has led to the diminishing of the depth of sand above the spongy iron to six inches. In spite, however, of this modification, the attendant difficulties remain very great. Moreover, the amount of spongy iron required for filling the beds is comparatively large, leading to a considerable original outlay, and the space covered by the filter-beds is twice as great as where sand-beds alone are employed, because after the treatment with spongy iron the water must be exposed to the air and filtered again through sand. Estimates have been made for a number of towns, but the process has been adopted nowhere else on the large scale, on account of the expense.

The necessity for extending the works at Antwerp, which, on the present plan, would involve an outlay of some £12,000, together with the difficulties which have been already mentioned, led the engineer, Mr. Anderson, to make experiments as to some other means of employing the same material, and acting on a suggestion of Sir Frederick Abel, he has devised a method which promises to be completely successful. The method consists in continually agitating a comparatively small quantity of spongy iron with the water, so that the iron is prevented from caking together, and new surfaces are continually exposed. The temporary apparatus now working at Antwerp consists of a revolving cylinder of boiler-iron, supported on hollow trunnions. The cylinder is some four feet in diameter and six or eight feet long, and furnished with three longitudinal

shelves, on which rest about 250 kilos of spongy iron. As the cylinder revolves the iron falls through the water, and the rate of flow is so regulated that the water remains in contact with the iron for a sufficient time to insure its purification. The maximum rate at which the water may be allowed to flow has not yet been determined, and, in fact, it would have to be determined by experiment in the case of each particular water; but enough has been done to prove that the treatment is certainly practicable, efficient, and not very expensive. It is estimated that not over one-fifth of a grain of iron is actually used up for each gallon of water treated. After the treatment the water must be exposed to the air and filtered, to remove the oxide of iron which is formed, but it is a question well worth the attention of our engineers whether this will not be a solution of the difficulties in the case of some of our water-supplies.

In the extension of the Antwerp works it is proposed to have a battery of these revolving cylinders, and it will be possible to use more or fewer of them, according to the condition of the water, or at times their use may be altogether dispensed with. The subsequent filtration will be through sand arranged in ordinary filter-beds, but there are several forms of filters now in the market which might be better suited to our conditions as capable of being housed and thus kept warm in winter. At Antwerp the filter-beds are kept from freezing by running live steam into the water, which is claimed to be more economical than to employ men, as is done elsewhere, to break up the ice and keep it from freezing on to the sides of the beds.

A remarkable fact has been noticed, namely, that when the iron is shaken up with water containing finely divided clay, which refuses to settle and cannot be entirely removed by filtration, coagulation or flocculation of the clay takes place, and the water can then be readily clarified by simple filtration. It is doubtful whether the iron must necessarily be employed in the form of spongy iron; probably other forms of finely divided iron would be found to answer nearly if not quite as well.

Without being too enthusiastic over a process not yet carried out on the large scale, I cannot help feeling that this is a matter of very great importance, and well worth the attention of those interested in water-supply.

SALFORD SEWAGE-WORKS.

WE take from the London *Builder* the following particulars about the main drainage system of the borough of Salford, England: "Ten years ago the corporation, with a laudable determination to face this difficulty, resolved to intercept all the sewage of the borough from the river Irwell, a stream polluted to an exceptional degree by town refuse and filth of every kind. As the subsidiary sewers were found to gravitate to the stream, the first part of the undertaking was the construction of an intercepting-culvert which should traverse the lowest part of the borough and pick up all the existing drains before reaching the river. This sewer is 8'9" x 7'6" at the point where it discharges into the river below the urban part of the borough, and passing upward toward its source the sewer is gradually reduced in dimensions. The upper lengths of the sewer are egg-shaped, the smallest dimensions being 4' x 3'. The total length of the main intercepting-sewer is four miles and four furlongs, and there is a subsidiary intercepting-culvert which collects the sewage from the higher parts of the Pendleton district of the borough, leading it direct to the tanks so as to avoid the cost of pumping.

"The principle of the treatment of the sewage is that of precipitation. There is a series of six tanks arranged end to end and the sewage flows from one tank to another through the whole series. The same arrangement is provided in duplicate, which admits of one set of tanks being cleaned out while the other set is in use.

"The tanks are intended to deal with twelve million gallons of sewage daily, though this quantity is considerably in excess of what at present passes into the sewerage system. The population of the borough at the present time is 177,000, and the domestic consumption of water 21 gallons a head, but there is a very large amount of water used for manufacturing purposes, chiefly in dyeing and bleaching. The water area of the tanks is 12,360 square yards, and the average depth is seven feet. The corporation employs lime as the precipitant and also alumino-ferric experimentally, with very good results so far.

"The engines and pumps are in duplicate. The engines are of the vertical type, compound in their arrangement, the high and low-pressure cylinders being placed above the rest of the machinery, after the modern type of marine engines. The pump-cylinders are immediately below the

steam-cylinders, so that the pressure of the steam is applied with the most direct action to the pump-plungers. The pumps are double-acting, and each pump is provided with two suction and delivery air-vessels.

"Each engine is capable of being worked up to an effective energy of 225 horse-power, which is sufficient to raise the ordinary flow of sewage to the tower of the mixing-house, the total vertical lift from level to level being forty-three feet. The second engine will only be required during times of rainfall or while the first engine is under repair. The rainfall provided for somewhat exceeds $\frac{1}{4}$ -inch in the day, as provision is made by storm-overflows for relieving the intercepting-sewer when the rainfall is excessive. The sewage is lifted from the pump and passes to the mixing-house through a pair of 30-inch mains. At the base of the tower of the mixing-house is placed a cast-iron tank, into which the sewage is first delivered, and here the lime or other precipitant is added to the sewage. From the bottom of this tank the sewage passes through another pair of 30-inch mains to the end of the tanks most remote from the mixing-house, and having been delivered into the first tank passes through the whole series of tanks, and flows slowly back toward the mixing-house. The greater part of the precipitate remains in the first and second tanks, the quantity diminishing in each succeeding tank until in the last tank there is little, if any, deposit, and the purified effluent flows away, passing into two small chambers where a pair of vortex wheels of 25 horse-power each are fixed. The purified sewage in its descent of fifteen feet drives the turbines, and the power thus developed is employed to actuate the mixing machinery and pumps within the building, and thus a certain economy is effected, as steam-power would otherwise have to be employed.

"The mixing machinery consists of a pair of large cast-iron pans, in which the lime is incorporated with the requisite quantity of water by means of revolving arms and plates attached to them obliquely. In order to insure that exactly the requisite quantity of lime shall not be exceeded, and to avoid the waste which usually results from the employment of manual labor, a lift or hoist is provided for measuring the lime. The hoist consists of a number of buckets attached to an endless band, somewhat similar to the arrangement used in a flour-mill. The buckets raise the lime, which first passes through a screen, from below, and deliver it into a funnel-shaped receptacle, into which a spray of water under pressure discharges, and thus the lime is carried forward into the mixing-pans. From the pans the limed water is pumped up to the tower, where it is delivered into the sewage-receiving tank, the lime-pump making one stroke for every stroke of the pumping-engines.

"There is a second pump provided for raising the clarified sewage from the turbine wheels to a tank placed on the top of the mixing-house tower, and this tank furnishes a supply of water for slaking and mixing with the lime."

THOMAS WISEDELL, ARCHITECT.

THOMAS WISEDELL, a theatrical architect, died on July 31, at his home in Yonkers, near this city. He was born in London in 1846, and when twenty-two years of age he attracted the attention of Mr. Calvert Vaux, of this city, and was invited to come to New York. In 1879 he became a member of the firm of Kimball & Wisedell, and under the direction of Mr. Frederick Law Olmstead designed the architectural features of the Capitol grounds at Washington, including the terrace. He was also associated with Mr. Olmstead in the architectural work of Prospect Park, Brooklyn. With Mr. Kimball he designed the Casino, the Madison Square Theatre, Harrigan & Hart's Theatre, the Springfield (Mass.) Opera House, and the Yonkers Opera House. He leaves a widow and three children.

CAREFUL observations of previous epidemics have demonstrated that the most active and potent agent in spreading the disease is *filth*. That the meaning of safety from this fell destroyer may be summed up in one word—*cleanliness*.

The situation is this: The most fatal malady now known to man is abroad and approaching. The means of defense are known and subject to our use. No serious disease proves more powerless against them than cholera. But to be effective they must be employed promptly, thoroughly, and in anticipation of the disease. It is therefore now no time for inaction. We cannot know how soon the enemy may be in our midst. We must act beforehand or it will be too late. We cannot erect fortifications under the fire of the foe.—*Dr. Lindsley of New Haven on Cholera.*

UNDERGROUND ELECTRIC CONDUITS IN PARIS.

BOSTON, July 27, 1884.

To the Editor of THE SANITARY ENGINEER:

THIS week's SANITARY ENGINEER, July 24, has an article on overhead wires which mentions the use of underground wires in Paris and Berlin. Thinking some of your readers might be interested to know what forms of cables are used by the Paris Telephone Co., I send herewith a description taken from De Parville's *l'Electricité et des Applications*, Paris Exposition. Respectfully,

Y. N. S.

"The General Telephone Company of Paris, which is a combination of the Blake, Gower, and Edison companies, uses mostly the Ader telephone, though some Crossleys and Edisons are still in use. The wires or cables used are all manufactured by the company, but are laid, at the company's expense, by the Government telegraph administration. The company pays to the State an annuity of 10 per cent. on the receipts and about \$5,000 bond. Then it pays to the city of Paris for a 12-inch right of way on the intrados of the sewers a tax of \$4 for the first 500 kilometers, \$6 for the second 500, \$8 for the third, and \$10 for the following. Any overhead lines are taxed at the rate of \$2. On 2,000 kilometers of cable there are but 107 overhead. All the rest are below ground, following the lines of sewers and house-branches. The charges are about \$120 per instrument.

"Each instrument has a return-wire so as to annul all induction. The wire is formed of 3 strands of copper wire $\frac{1}{2}$ mm. in diameter, with a covering of 0 mm. 3 of gutta-percha; 14 of these wires (7 lines and 7 returns) are incased in a lead pipe, making a diameter of 18 mm. for each cable; each line with its covering measures 2 mm. 4 diameter. The cost per kilometer is about \$560. Lightning protectors are used only on overhead or mixed lines. The 1-foot right of way in the sewer can take 51 cables or 357 separate lines.

"The Berthored and Borel process of protecting underground wire is to take copper wire with a wrapping of paraffined cotton and pass it first through a tank of hot paraffine and directly afterward through a tank of melted lead with perforated piston, which forms the lead pipe right around the wire, and prevents all danger of the covering being torn off. The thickness of lead may be varied as desired, and a cable of any length may be turned right out from the machine. The machine will make about 25 meters per minute. For cables laid in the ground usually they are passed a second time through the lead after being coated with bran or tar residue. Another advantage is that the lead may be used as the return wire, as the section of the lead being much greater than that of the wire makes up for its feeble conductivity. This wire has been tried for telephones, electric-light, and transmission of power by electricity, with apparent satisfaction."

STANDARD CANDLES.

MR. N. H. HUMPHREYS, in a communication to the *Journal of Gas-Lighting*, speaking of the standard candle, says: "It is difficult to understand why a candle cannot be made that may be depended upon; a candle approximating closely to the parliamentary conditions, due regard being had to the composition of the spermaceti, the nature of the material used, the number of strands, mode of plaiting, and weight per yard of the wick, the accurate centering of the same, and the truly cylindrical shape of the finished article." Mr. F. W. Hartley takes the writer to task for his "apparent ignorance" of the many efforts which have been made in the production of perfect sperm candles. He very correctly urges that competent persons "have earnestly and diligently essayed to make the sperm candle such a trustworthy light-unit as Mr. Humphreys imagines it might be made. In these efforts neither money nor labor has been spared." Mr. Hartley expresses the opinion that the sperm candle is "as good now as it ever will be," and that it is a waste of time and energy "to write speculative articles upon such apparently possible means of improvement as practical experience has shown to be of no avail."

THE University authorities of Oxford have appointed a committee to inquire into the water-supply.

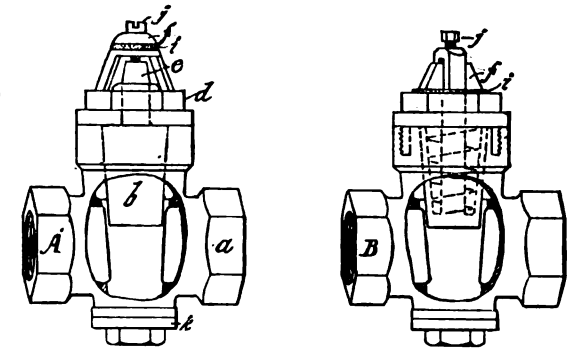
THE Brooklyn Board of Health has ascertained that a private school was kept on the first floor of a house, on the second floor of which diphtheria existed. At the request of the inspector of the board the teacher has closed the school.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

SAFETY-COCKS.

OUR illustration this week represents "Cosgrove's" automatic stop-cocks. Their object is to automatically shut off the flow of gas or oil through pipes in case of fire. The cock marked A is intended to be put on the iron service-pipe outside the gas-meter, to stop the flow of gas in case of fire. The cock B is intended for use in pipes about oil refineries and between oil-tanks, to stop the flow of oil in case of fire or extreme heat. Essentially they are: A barrel of an ordinary cock, *a*, a taper-plug, *b*, without a water-way, but with a stem, *c*, into which is tapped the set-



screw *j*, and a fusible button or key, *f*, as the case may be. In the cock A, the screw *j*, which rests on the fusible button *f*, screws into the stem of the plug, and holds it open in the position shown. Between the button *f* and the yoke *d* is a heat-insulating washer, *i*, to prevent the heat passing from the button to the cock should the button be the first exposed to the heat. When the button is fused away the plug is forced to its seat by a spiral spring, the screw-head *j* passing through a large hole in the head of the yoke. In the cock for oil a fusible key, *f*, is passed through a hole in the stem, and the plug tightened backward by the screw, an insulating washer, *i*, being used, as before. The melting of the key *f* allows the plug to drop into place.

The composition used in the button and key is said to melt in hot air of somewhat less than 200° Fah.

The agent for the United States is E. F. Jennings, of 339 York Street, Jersey City, N. J.

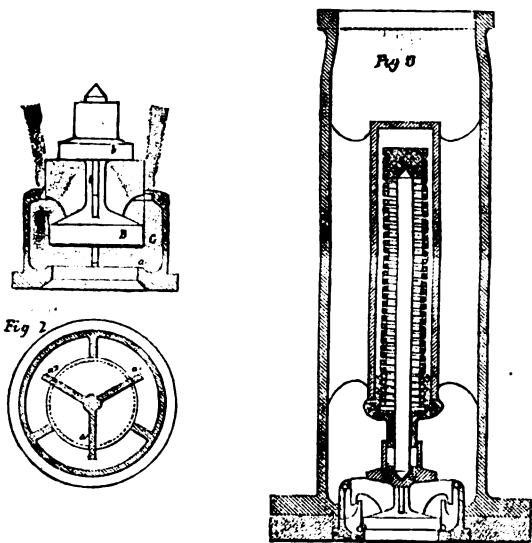
SAFETY-VALVE.

THE safety-valve we here illustrate is described in *Engineering*. The ideal safety-valve is one that will rise gently from its seat the moment the pressure to which it is set is attained, will give a wide opening varying with the excess of pressure, and return slowly when sufficient relief has been afforded to the boiler. It is claimed for the valve that it fulfills these requirements, and that it is as simple in construction and as easy to manipulate as a valve of the ordinary form. When the pressure is on the point of attaining its determined limit, the valve lifts and the steam blows past. As it continues to rise, the steam escapes freely into the atmosphere by the annular space C (Fig. 1), existing between the cylinder A and the upper disc *b* of the valve. The quantity of steam increasing as the valve rises, the cylinder becomes filled, and the cylinder A, being contracted at its upper portion by the lip or internal flange *a*, a great part of the steam is projected under the upper disc *b* of the valve B, and forces it to continue its upward motion.

This valve can be loaded in any of the usual ways, either by weights or springs. Fig. 3 shows the latter method. The pressure is applied by means of a pointed rod and a helical spring. The latter is contained in a case by which it is defended from the steam, so that it may not be corroded.

A series of experiments upon this safety-valve were carried out by M. Roland, chief engineer to the Association Normande des Propriétaires d'Appareils à Vapeur, with the view of testing its capabilities. The boiler to which it was applied had 279 square feet of heating surface, and the valve had an orifice 1.97 inches in diameter, and was adjusted for a pressure of 56.89 pounds per square inch.

The first trial commenced with a pressure of 51.487 pounds; three minutes after, the pressure being at 55.43 pounds, the valve commenced to blow; at 56.181 pounds the valve was raised one-tenth of a millimetre ($\frac{1}{80}$ inch); at 56.323 pounds, two-tenths; at 56.607 pounds, four-tenths; at 56.750 pounds, five-tenths; twenty seconds later, the pressure



being 56.850 pounds, the valve rose $12\frac{1}{2}$ millimetres, or half an inch, about one-quarter of its diameter. Twenty seconds later it commenced to close, and after two seconds was completely shut at a pressure of 54.1 pounds.

A second experiment gave almost identical results, and in the third experiment the whole of the steam of the boiler was delivered through the valve, the damper being full open, and the fire active. The valve rose the first time at 10.50, opening and closing eight times between then and 11.4, the pressure never exceeding 55.47 pounds.

THE PROPAGATION OF CHOLERA.

THERE is a specific infective cause of Asiatic cholera, called its contagium, by which it spreads as rapidly as the persons suffering from it may go from place to place. This contagium ceases to be repropagated beyond the sanitary lines which separate the cleansed, drained, and ventilated premises and well-conditioned inhabitants from those that are filthy, undrained, badly-sewered, crowded, and unventilated, or where polluted water or crude food and harmful beverages prepare the bowels for the fatal operation of the cholera poison. The modern facilities of travel and transportation now tend to spread cholera over all the continents in a single year as readily as it was conveyed in the fifteen years of slower marching in its first great invasion.

It must have three factors for its cultivation: 1, A centre of pollution for its cradle; 2, a ship for its transport; 3, a number of towns prepared for its reception and development.

The matters which a cholera patient discharges from the stomach and bowels are infective, and when decomposing or for a short time remaining in wet or foul places or in water used for drinking, become a prolific source of propagation of the disease, and lines of danger are conspicuous in Egypt and all the Mediterranean countries, and they exist in all the European cities whence emigrants depart for New York and other American ports. The sanitary neglects that have prepared for a lodgment and repropagation of the cholera in filthy places and sodden grounds, are found in every port, city, village, and manufacturing town, and in many a rural neighborhood and hamlet.

The presence of excremental filth, uncleansed dwellings, stagnant pools, polluted water, and of great numbers of badly-housed and imprudent people in hundreds of places in this State, will invite cholera whenever it appears in any city on our Atlantic seaboard.

The exclusion of cholera from the ports of our country and the instant arrest and suppression of it as a malady which has subtle ways of spreading is the first duty that the sanitary authorities in this State have provided for, and now, before the exotic infection has come, let all local boards of health and all householders lose no time in enforcing such thorough scavenging and cleansing, such cleaning of sewers, drains, and ditches, and such ventilating, drying, lime-washing, and disinfecting of cellars and all damp and unclean places, that, if cholera comes, its infective germs shall find no soil or foul surface in which to propagate epidemically.

Cholera is so little contagious, in the sense in which small-pox and typhus are called contagious, that if proper precautions are taken there is scarcely any risk that the disease will spread to those who nurse or otherwise closely attend upon the sick.—*Memorandum of the New York State Board of Health.*

PLUMBING-WORK NOW GOING ON.

IN the district of this city which may conveniently be bounded on the north by Eighty-sixth Street, and on the south by Fifty-seventh Street, between the parallels of Fourth Avenue and the Park in the upper portion and Fourth and Eighth Avenues in the lower portion, there are now in process of building, or but just completed, many elegant private residences, immense apartment-houses, and blocks of less pretentious, but substantial dwelling-houses and small flats. When it is stated that one of the blocks of apartment-houses will lodge one hundred and twenty-eight families, and at least two of them are fourteen stories high in the rear, with fronts of ten or eleven stories, while some of the private residences are built for some of the wealthiest citizens, it will be understood that the extent and elegance of the plumbing-work are great. Some of the most notable of these works are from time to time presented to our readers in our illustrated descriptions, but it seems worth while to make more general notice of them than is possible in those articles. Accordingly we have prepared some brief running notes on the works now actually in progress in this region, and shall hereafter treat other districts of the city in the same way. Our readers will understand that many of the master plumbers whose work is here noticed have other works now in construction in other parts of the city. There are some very extensive plumbing jobs now in progress in the down-town commercial region. These will be reached and noticed in due course.

On Fifth Avenue, the uppermost house we mention is the residence of Adolphus Kerbs, between Seventy-ninth and Eightieth Streets; the architects, D. & J. Jardine; the plumber, Thomas Cochrane. The work in this, which is just about finished, is by contract. Here in suspending the iron house-drain from the cellar, Mr. Cochrane makes use of specially-contrived hangers which grasp the iron beam of the fire-proof flooring and carry a ring supporting the drain-pipe. All hot-water pipes are of brass, and the baths and sinks are porcelain. It was here necessary to put in under-drainage of the foundation, and the seal of the trap on these drains is secured against evaporation by an auxiliary flush from the servants' water-closet supply.

Next below this we notice the residence of Henry H. Cook, at the corner of Seventy-eighth Street. Of this notable house, W. Wheeler Smith is architect and James Muir plumber, and the plumbing is by days' work and is now about finished. It is marked by the use of marble and tiling. Several bath-rooms in this house have marble floors and marble bath-casings and top-pieces, and it deserves mention that the servants' bath-room is also marble paved, with marble casing for the bath. There are in the details of the work the same special features as respects disposal of safe-wastes, and other points which we have before illustrated in descriptions of houses plumbed by Mr. Muir.

On Fifth Avenue, in the block between Seventy-fifth and Seventy-fourth Streets, Mead & Rossman are now doing the plumbing of two private residences, both on contract. The upper house, at the corner of Seventy-fifth Street, is owned by Alfred M. Hoyt, McKim, Mead & White the architects; the house below, Jacob H. Schiff's, is built on plans of Schwarzman & Buckman. In the Hoyt house Mead & Rossman have employed automatic flushing to insure the sealing of the trap on the cellar-drain, as we shall hereafter notice at length. As it was here necessary to drain the site of the house, to prevent the possibility of evaporating the seal of the trap between these drains and the Seventy-fifth Street sewer, the regular flush from automatic-tank was resorted to.

The residence of Charles T. Barney, at the corner Fifth Avenue and Sixty-third Street, ——— architect, is plumbed by William H. Quick. The work is now completed. Mr. Quick is also the plumber of a flat on Sixty-first Street, between Ninth Avenue and Broadway. This will accommodate eight families. The number of fittings indicates the amount of plumbing in a flat of this size. There are 13 water-closets, 8 baths, 17 wash-basins, and the fittings and fixtures in 8 kitchens. Connections are made with 2 street sewers by 6-inch main drains. There are 3 lines of 5-inch soil-pipe, and 6 lines of 3-inch waste-pipe.

The plumbing in the residence of A. J. White, at Sixty-sixth Street and Fifth Avenue, now nearly finished, is by John Renehan; the architect is James E. Ware. Here there is a special system of ventilation of urinals and water-closet bowls into a heated flue. This, as well as the construction of the house-tanks and manner of carrying water-pipes beneath floors, was noticed in our issues of January 3 and January 17, 1884.

On the north-west corner of Madison avenue and Sixty-ninth Street is the residence owned by Adolph Kuttroff and on the south side of Sixty-ninth Street, between Madison and Fifth Avenues, the residence of August Richards. Of both the architect is William Schickel; the plumber, Thomas J. Byrne. The plumbing in the Kuttroff house is finished, that in the Richards house is in progress, and both are by contract. The work is marked by the amount of tiling here used in bath-rooms, about slop-sinks, and in kitchens and laundries. In the Richards house is the first example of the auxiliary boiler or heater, invented by John Tucker, Mr. Byrne's foreman, for the heating of two boilers from a single water-back. The contrivance was described in our novelty column in the issue of July 31.

On Madison Avenue, at the corner of Fifty-ninth Street, there is now building a ten-story apartment-house for the Messrs. Kilpatrick. The architects are C. W. Romeyn & Co.; the plumber is William Foster. This building will contain apartments for about 36 families. In the plumbing there are 16 lines of 5-inch, 4-inch, and 3-inch soil and waste-pipes, about 50 water-closets, 36 baths, and the fixtures and fittings of 36 kitchens. For floors above the reach of pressure in the street water-pipes there is a 5,000-gallon tank and Rider's pumping-engine. Here we may add that tanks and pumping-engines are generally in use in all the extensive new houses, private or commercial.

On the north-west corner of Seventy-second Street and Madison Avenue is one of the largest private residences in the city—that of Charles L. Tiffany. The architects are McKim, Mead & White; the plumber is John H. Graham. The work is not yet sufficiently advanced to permit any extended reference, but its extent is indicated by the fact that there will be from 12 to 15 lines of waste and leaders. Special attention is being devoted to making all parts of the main house-drains which connect with the sewers accessible by laying the drains in brick trenches which may be readily uncovered. The plumbing is by days' work.

On Fifty-seventh Street and Seventh Avenue there is now building an apartment-house, ten stories in front and fourteen in rear, James E. Ware, architect, of which the rough iron-work only is as yet in. This work is being done by Charles Askey. The owner is Thomas Osborn.

In the quarter of the city we are here noticing, or just above, at Fourth Avenue and Eighty-seventh Street, there is building an apartment-house, of which, at the time of compiling our notices, the plumber had not been selected.

In our district come the immense jobs in the eight great apartment-houses, generally known as the Navarro houses, between Fifty-seventh and Fifty-eighth Streets and Seventh Avenue and Broadway. Several of these are done by J. A. Macdonald, and some particulars indicating the extent of the work will be hereafter given. The houses will accommodate 128 families.

WORK OF THE PARIS MUNICIPAL LABORATORY DURING MAY, 1884.

THE following are some of the more important articles of food examined at the Municipal Laboratory of Paris during the month of May. In the first column are given the total number of samples examined, and in the second column those pronounced good:

	Total.	Good.
Wines.....	558	118
Vinegars.....	15	5
Beers.....	9	6
Ciders.....	11	9
Alcoholic Liqueurs.....	20	10
Waters.....	21	2
Milks.....	424	320
Butters.....	13	10
Oils.....	7	3
Flours.....	15	10
Peppers.....	25	10
Coffees, Chicories, and Teas.....	27	21
Chocolates and Cocoas.....	23	4

EDGEWATER, S. I., citizens have been greatly excited over the nuisances from the cream of tartar factory, and have held meetings at which threats of violent action were made. The Health Officer, Dr. J. L. Feeney, has notified the concern that it must close.

A SANITARY service has been organized in Serbia, which consists of a general sanitary council, of medical officers appointed in different districts, and a sanitary department under the jurisdiction of the Minister for Home Affairs. The Government has recently instituted a Public Health budget.

Reviews of Books.

SIXTH ANNUAL REPORT OF THE CONNECTICUT STATE BOARD OF HEALTH, for the fiscal year ending November 30, 1883, with the Registration Report for 1882. Hartford: 1884. 315 and 124 pp. 8vo.

In the general report with which this volume commences it is shown that all classes of society are beginning to take some interest in the principles of sanitary science, and that "while these are sometimes only half comprehended, and the effort is too often made to secure some crude, illy-understood, and, therefore, perverted measure, the results upon the whole are most encouraging."

The general health of the State in 1883 is not considered as satisfactory, since local epidemics have been common, and malarial diseases have continued to increase. Pneumonia and capillary bronchitis are said to have increased, as has also scarlet fever. We cannot agree with the opinion expressed, that scarlet fever is "a filth disease, extremely liable to appear when there is neglect of hygienic requirements."

An increase in typhoid fever is reported, and it is stated that an antagonism exists between typhoid and malarial fevers. The destruction of the forests of the State, and especially of those at the headwaters of the Connecticut, is alluded to as a possible cause of the increase of malaria. The reporter seems a little hazy in his mind as to what forms of disease should be termed malarious, since he does not include bilious remittent fever as a malarial fever, which is contrary to the usual classification.

Attention is properly called to the necessity for systematic experimental investigations into the causation of disease, such as were commenced by the National Board of Health, and are now being carried on at Government expense in France and Germany, and it is suggested that State Boards of Health should combine for this purpose.

The desirability of a complete and careful topographical survey of the State, from a sanitary point of view, is urged, and it is stated that "few States have so little knowledge of their material resources, and of the area of the very towns themselves." It is certainly time that Connecticut should supply this deficiency.

The organization of local boards of health throughout the State is in an unsatisfactory condition. "It is doubtful if, apart from New Haven, any of the health boards report regularly each year, or, in many cases, if they keep a record of proceedings."

The special papers appended to the general report are interesting and valuable. The first, by Dr. George F. Lewis, is a description of the Bridgeport Hospital, with plans, which should be consulted by all who are interested in hospital construction. The general plan of the ward adopted is that of the Johns Hopkins ward.

The second is by Professor G. A. Smyth, on hygienic institutes, the utility of their work of investigation, and the need of it in this country. This paper is too general and vague; a definite scheme for a hygienic laboratory, with estimates of cost of construction of apparatus and of maintenance, would have been much more useful.

The paper by Dr. Charles Gardiner, on "Some of the Insanitary Conditions of Country Life," is a brief tract for popular reading. Mr. Gerhard's paper on the sanitary drainage of tenement-houses is a good one, but contains nothing that will be new to readers of THE SANITARY ENGINEER.

Dr. Lincoln's paper on "The District School-House," is practical and useful, and should be widely circulated.

The special investigations and reports on the sanitary conditions at Yale, the sewerage of Waterbury, typhoid fever in Waterbury, the Torrington water-supply, scarlet fever in Talcottville, diphtheria in Hartford, and on the Wallingford Water-works, illustrate the various questions which come before State sanitary authorities.

The registration report for 1882 shows a birth-rate of 23.9 per 1,000, and a death-rate of 18.7 per 1,000, calculated on the population given by the census of 1880—the increase in population since that date being considered as compensating for the known deficiencies in the returns. On what grounds this estimate has been made is not stated. Twenty-nine per cent. of all the deaths were under five years of age.

The annual expense of the Board of Health is \$3,000.

It will be seen from this brief summary that this report, though recording no remarkable discoveries and very little original investigation, is a good educational document, which ranks well among State board reports, and will be found interesting not only by the unprofessional public, but by those who are more immediately interested in practical sanitary work.

ANNUAL REPORT OF THE HEALTH OFFICER OF THE DISTRICT OF COLUMBIA, 1883. 199 pp. 8vo. Washington, 1884.

The mortality statistics for the year, as given in this report, show an annual death-rate of 17.97 per 1,000 for the white and 30.68 for the colored. This is a low death-rate and is a diminution from that of the preceding year. There were 3 deaths from small-pox, 6 from measles, 24 from croup, 85 from diphtheria, 125 from scarlet fever, 92 from typhoid fever, 38 from typho-malarial fever, and 95 from various forms of malarial fevers. Evidently, there is still room for improvement. It is remarked that the popular impression that measles, croup, diphtheria, and scarlet fever are more fatal among the colored population than among the white is not borne out by the death-record of the District for the last five years. During that period the death-rate from measles was, for the whites, .031 per 1,000; for the colored, .027; croup, .302 white, .263 colored; diphtheria, .549 white, .339 colored; scarlet fever, .499 white, .139 colored; malarial fevers, .085 white, .288 colored. The usual maps are given, showing the distribution in the city, by streets, of deaths from certain causes, and the whole forms a valuable contribution to vital statistics, especially when taken in connection with the reports of preceding years.

The Inspector of Plumbing, Mr. S. A. Robinson, reports that during the year he has made 853 inspections of work in new houses and 576 in old ones, and calls attention to the fact that it is impossible for him, without assistance, to properly perform his duties. He states that the plumbing-work done in the city is, as a rule, of a superior character and creditable to the plumbers. The matter of two or more houses drained by one sewer continues to give trouble. "A former municipal management very unwisely permitted the erection of whole blocks of houses with only one connection with the public sewer, from which we are now reaping a harvest of trouble."

He urges the more general introduction of hopper-closets in preference to valve-closets, on the ground that the latter are the cause of the deficient water-supply of the city, and says that "fully one-half of the water flowing daily into the city is wastefully threading its way through tens of thousands of defective 'valve' water-closets. When such closets are in good order, a quantity of water is sustained in the basin by a valve, upon the raising of which the water flows away in a sneaking manner, displacing the previous contents of the trap, with its own load of excremental filth to remain in active fermentation until the next time the closet is used." Setting aside the exaggeration as to the number of closets in this statement, it would certainly lead one to suppose that Mr. Robinson's ideas as to what a valve-closet and what a hopper-closet is must be exceedingly vague, and that he does not know the difference in the effects on water-waste between closets connected directly with the mains and those having a cistern-supply. His philippic is probably, in reality, directed against one particular form of plunger-closet, in which the outlet is controlled by a plug, and which is connected directly with the mains, but by want of care in expressing himself, and through fear of naming specifically the objectionable closet or closets to which he refers, he has made a blunder and committed an injustice.

The Health Office seems to have been active and fairly successful in the abatement of nuisances of various kinds. There seems to be need for an abattoir for the city, and it is time that Congress should legislate on this subject. The inspectors of food seem to have been active, judging from the amount of various articles reported as having been condemned as unwholesome, including, among many other items, 8,854 pounds of beef, 11,880 heads of cabbage and lettuce, 18,000 cantaloupes, 19,830 water-melons, over 25,000 herrings, and 11,014 bunches of other fish, 16,000 bushels of oysters, 107,160 crabs, etc., etc.

Upon the whole, this is a good report, and one upon which the Health Officer, Dr. Smith Townshend, is to be congratulated.

REPORT OF THE MEDICAL OFFICER OF HEALTH OF THE SANITARY CONDITION OF THE CITY AND COUNTY OF BRISTOL AND THE PORT OF BRISTOL. 19 pp. 8vo. Bristol, 1884.

This report, by Dr. David Davies, shows that the mortality-rate for the year was 17.8 per 1,000, being in continuation of the progressive diminution of mortality which appears to have been going on since 1876, when it was 22.6 per 1,000.

Upon this fact Dr. Davies relies for a reply to certain critics who seem to have greatly troubled his quiet by point-

ing out that some parts of Bristol are filthy, and by objecting to having ashes mixed with household refuse and street-sweepings dumped in or near the city. Dr. Davies says he has never seen any fever or other disease arise from such deposits. If health officers are to wait until they can obtain convincing evidence that a given collection of decaying organic matter has produced disease, they will be of very little use. He advises cremation of refuse, because it would "add much to my (his) comfort." Clearly Dr. Davies objects very strongly to being disturbed by complaints or criticisms, and the petulance displayed on this point in his report is rather ludicrous.

Nevertheless, in so far as he is disposed to lay weight on measures of disinfection and isolation for preventing the spread of such a disease as scarlet fever, we agree with him. His remark, that "when a case (of scarlet fever) occurs in a house, the patient's friends, instead of searching for the source of infection and ascertaining how it reached their family, waste their endeavors in disturbing their own or their neighbors' drains, or in getting ejected some unfortunate pig which may be in the locality, or in getting an ash-heap removed," shows that he is not in sympathy with measures for promoting municipal cleanliness. It is no doubt true that the pig-stye and the ash-heap are not the causes of scarlet fever, but to say that it is a waste of effort to get rid of such nuisances from the midst of a city, is to prove one's self unfitted for the duties of a sanitary official, as these are indicated in existing laws.

GUARDING AGAINST CHOLERA.

AT the request of a correspondent we reprint here a letter from Miss Florence Nightingale to the New York Herald, on means of preventing the spread of cholera:

"SIR: I beg to reply to your note asking for 'practical advice in view of the rapid spread of cholera.'"

"That our whole experience in India, where cholera is never wholly absent, tends to prove—nay, actually does prove—that cholera is not communicable from person to person."

"That the disease cannot be ascribed to 'somebody else'; that is, that the sick do not manufacture a 'special poison' which causes the disease."

"That cholera is a local disease—an epidemic affecting localities, and there depending on pollution of earth, air, and water and buildings."

"That the isolation of the sick cannot stop the disease, nor quarantine nor cordons, nor the like. These, indeed, may tend fatally to aggravate the disease, directly and indirectly, by turning away our attention from the only measures which can stop it."

"That the only preventive is to put the earth, air, and water and buildings into a healthy state by scavenging, limewashing, and every kind of sanitary work, and, if cholera does come, to move the people from the places where the disease has broken out and then to cleanse."

"Persons about cholera patients do not 'catch' the disease from the sick any more than cases of poisoning 'infect' others. If a number of persons have been poisoned, say by arsenic put by mistake into food, it is because they have each swallowed the arsenic. It is not because they have taken 'it,' the 'mysterious influence,' of one another."

"In looking sadly at Egypt—Egypt, where cholera did not begin anywhere along the route from India to Europe, but at Damietta, where no ship and no passenger ever stops, and where the dreadful insanitary condition of the place fully accounts for any outbreak of cholera—in sorrowfully looking at Egypt and at Europe now, one might almost say that it is this doctrine of a special poison emanating from the sick, and which it is thought can be carried in a package, that has (mentally) 'poisoned' us. People will soon believe that you can take cholera by taking a railway ticket. They speak as if the only reason against enforcing quarantine were, not that it is an impossibility and an absurdity to stop disease in this way, but that it is impossible to enforce quarantine. 'If only we could,' they say, 'all would be well.'"

"Vigorously enforce sanitary measures, but with judgment—*i. e.*, scavenge, scavenge, scavenge; wash, cleanse, and limewash; remove all putrid human refuse from privies and cesspits, and cesspools and dust-bins; look to stables and cowsheds and pigsties; look to common lodging-houses and crowded places, dirty houses and yards. 'Set your house in order' in all ways sanitary and hygienic, according to the conditions of the place, and 'all will be well.'"

"The real danger to be feared is in blaming somebody else and not our ourselves for such an epidemic visitation. As a matter of fact, if the disease attacks our neighbors we ourselves are already liable to it. To trust for protection to stopping intercourse would be just as rational as to try to sweep back an incoming flood instead of getting out of its way."

"With the most earnest wish that America, as well as England, may 'set her house in order,' and so defy cholera and turn its appearance elsewhere into a blessing, pray believe me,

Ever her and your faithful servant,

"FLORENCE NIGHTINGALE."

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING JULY 26, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.					Measles.	Puerperal Diseases.	Small-pox.
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																							
Portland, Maine	35,000	13	19.8	3	23.0			1															
Boston, Mass.	435,000	210	25.8	140	64.8	7		13		67	2				6	5		5					
Lowell, Mass.	71,500	34	24.7	21	61.7		2	2		15						1							
Worcester, Mass.	69,000	26	19.6	11	42.3			4		8	1					1		1					
Fall River, Mass.	67,000	51	39.6	41	80.3	1	2			31							1						
New Haven, Conn.	69,500	39	29.2	22	56.4			2		12													
Providence, R. I.	125,000	53	22.0	33	62.2	1		5	1	25							1	1					
Total	872,000	432	25.8	271	62.7	10	4	27	1	158	3				6	8	2	9					
EASTERN CITIES.																							
Albany, New York	103,000	49	24.7	20	40.8	1		8	1	10	1			1	1	2				1			
New York, New York	1,355,000	888	34.1	480	54.0	15	5	101	9	252	19	5	10	11	10	38	12	1	13	33	11		
Brooklyn, New York	670,000	379	29.4	207	54.6			38	1	129	4		2	8		12	1	7		2	4		
Hudson County, New Jersey	225,000	113	26.1	62	54.8			9	1	22	2	1	3		2	2		1		1	2		
Newark, New Jersey	154,000	93	31.4	45	48.3			16		25	1		3	1		2		1		1	2		
Philadelphia, Pa.	940,000	417	29.5	218	52.2	6	1	43	6	86	13	2			6	12	2	5		1	1		
Wilmington, Delaware	50,000	24	25.0	13	54.1	2	1	5		14	1		1							1	1		
Total	3,497,000	1,963	29.2	1,045	53.2	40	8	220	18	538	41	8	21	21	19	68	3	27	1	37	21		
LAKE CITIES.																							
Buffalo, New York	105,000	34	16.8	12	35.2			5	1	1	1					3	1	1			1		
Rochester, New York	210,000	114	28.2	77	67.5			11		49	2		1		1					9			
Cleveland, Ohio	140,000	103	38.3	69	66.9			4		34	7		3	3	2	3	1	6		12	2		
Detroit, Michigan	650,000	382	30.6	261	68.3	16	3	16	4	130	7												
Chicago, Illinois	1,000,000	80	41.6	61	76.2	1		4	2	37			2			1				1	1		
Milwaukee, Wisconsin	34,000	21	38.1	11	52.3	2		3		3										1	1		
Total	1,105,000	633	29.8	419	66.1	16	3	36	5	214	17		5	3	9	19	2	7		21	3		
RIVER CITIES.																							
Pittsburg, Pa.	210,000	85	21.0	56	65.8	9		5		24	3				2	1	3	3			2		
Cincinnati, Ohio	275,600	118	22.3	44	37.2	9		15		17	2		4		2	1	1				2		
Louisville, Ky.	137,000	68	25.8	32	47.0	4	2	10		12					1		2						
Indianapolis, Ind.	100,000	80	41.6	61	76.2	1		4	2	37			2			1				1	1		
Evansville, Ind.	34,000	21	38.1	11	52.3	2		3		3										1	1		
St. Louis, Mo.	375,000	180	25.0	97	53.8	14	1	15		26	3	1	2	8	3	7		4		1			
Total	1,131,600	522	24.0	301	57.6	39	3	52	2	119	8	1	8	8	8	10	4	11		3	5		
SOUTHERN CITIES.																							
District of Columbia	133,800	54	21.0	21	38.8	2		9		14			1	2									
Richmond, Va.	69,300	48	36.0	24	50.0	4		9		9	1					2							
Charleston, S. C.	41,000	18	22.8	6	33.3		1	2		5	1				3								
Atlanta, Geo.	32,400	27	43.4	17	62.9	1		1		4													
Augusta, Geo.	25,000	15	31.2	6	40.0					6					2								
Nashville, Tenn.	27,800	27	50.6	14	51.8	1		6		4			1			1					1		
Memphis, Tenn.	30,000	12	20.8	6	50.0			1		5	1		1			1							
New Orleans, La.	20,000	17	44.2	11	64.7	1		1		5	1		1			1					1		
Total White.	455,900	219	25.0	80	36.5	9	2	25		48	2		8	14	2	9		5		1	1	1	
Total Colored.	248,800	190	39.7	89	46.8	18	1	25		37	2		4	4		9				1	1	1	
Total in 31 U. S. Cities	7,310,300	3,959	28.2	2,205	55.6	127	21	385	26	1,114	73	9	46	50	44	114	11	59	1	63	30	5	
Week ending July 26, 1884, in 30 U. S. Cities	6,298,500	3,431	28.3	1,780	52.1	105	19	343	24	950	70	5	46	50	37	79	11	43	1	34	31	23	
July 12, Total in 28 English Cities	8,762,354	3,726	22.2			143				495	22		51		71					102		32	
" 12, " 8 Scottish Cities	1,254,607	507	21.0			19				32	9		3		10					10			
" 12, " 16 Irish Cities	858,660	315	19.1			9				60	3		3		8					54			
" 12, " 139 German Cities																				47			
" 12, " 15 Swiss Cities	455,537	192	21.8			20				31	5		7		2					15			

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending July 26, 1884, in 31 cities of the United States, having an aggregate population of 7,310,300, there were reported 3,959 deaths, which is equivalent to an annual death-rate of 28.2 per 1,000, a decrease of 0.1 as compared with the previous week, also a decrease of 0.1 as compared with the corresponding week of last year. In the North Atlantic cities the rate was 25.8; in the Eastern cities, 29.2; in the Lake cities, 29.8; in the River cities, 24.0; and in the Southern cities, for the whites 25.0, and for the colored 39.7 per 1,000. Over one-half, or 55.6 per cent., of all deaths were under 5 years, the proportion rising highest in the Lake cities, where it was 66.1 per cent., and in the North Atlantic cities it was 62.7 per cent.

Accidents caused 3.2, consumption 9.7, diarrhoeal diseases 28.1, and diphtheria 1.8 per cent. of all deaths. The percentage from diarrhoeal diseases was highest in the North Atlantic cities, 36.5, and in the Lake cities, 33.8, and was lowest in the Southern cities, among the colored, 19.4 per cent. Typhoid fever caused 1.1 per cent., malarial fevers 1.2, scarlet fever 1.1, pneumonia 2.8, bronchitis 1.5, and whooping-cough 1.4 per cent. of the total mortality. The percentage of

deaths from measles continues highest in the Lake cities, where it caused 3.3 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 53 new cases of scarlet fever, 14 of diphtheria, and 14 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 13 cases of diphtheria and 10 of scarlet fever.

BALTIMORE, MD.—The report of the Health Officer for the week records 100 deaths, of which 108, or 51.5 per cent., were children under 5 years of age. The annual death-rate for the whole population was 24.15 per 1,000, or 22.05 for the whites, and 36.40 for the colored. Diphtheria caused 5 deaths, croup 1, scarlet fever 2, whooping-cough 6, typhoid fever 4, malarial fever 1, diarrhoeal diseases 65, consumption 20, acute lung diseases 2, and violence 7.

MASSACHUSETTS.—In 106 cities of the State, with an aggregate population of 1,383,104, there were, during the week ending July 19, 494 deaths. Of the decedents 224, or 45.3 per cent., were under 5 years of age. The annual death-rate was 18.5 per 1,000. The highest rates recorded were 30.8 in Lawrence, and 27.4 in Holyoke. The zymotic diseases caused 170 deaths, including diarrhoeal diseases 109, nearly one-fourth of the whole mortality, diphtheria and croup 12, whooping-cough 9, cerebro-spinal meningitis 8, typhoid fever 8, scarlet fever 6, malarial fevers 2, and measles 1.

DISTRICT OF COLUMBIA.—Dr. S. Townshend in his report for the month of June reports 443 deaths, which is equivalent to an annual death-rate of 26.5 per 1,000. Of the decedents 234 were white, and 209 colored, being equivalent respectively to the death-rates of 22.2 for the whites and 36.1 for the colored. The number of deaths

under 5 years of age was 246, or more than 50 per cent. of the total mortality. Diarrhoeal diseases caused 99 deaths, or 22.3 per cent. of all deaths. Measles caused 1 death, scarlet fever 16, typhoid fever 6, diphtheria 2, whooping-cough 7, consumption 67, and violence 9.

HUDSON COUNTY, N. J.—The number of deaths for the month of June, as shown by the Health Officer's report, was 387, which is equivalent to an annual death-rate of 22.3 per 1,000. This rate is 0.4 above the average of the corresponding month for the past 7 years. There has also been an increased mortality from diarrhoeal diseases as compared with the past seven years. The number of decedents under five years was 181. Consumption caused 56 deaths, diphtheria and croup 7, diarrhoea 47, typhoid fever 7, scarlet fever 9, and whooping-cough 1.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales for the week ending July 12 was 22.2 per 1,000. The highest rate recorded was 25.9 in Halifax, the lowest 11.1 in Plymouth. Small-pox caused 21 deaths in London, exclusive of 15 cases in the Metropolitan Asylum Hospitals, outside of the city; also 6 in Liverpool, 2 in Sunderland, and 1 in Sheffield, 1 in Hull, and 1 in Cardiff.

LONDON.—Births, 2,409; deaths, 1,849, the latter being equivalent to an annual death-rate of 24.0 per 1,000, and is higher than in any previous week of this year. Of the decedents 1,010 were under five years. The number of cases of small-pox in the hospitals, which was 1,449 the previous week, declined to 1,321, there having entered 284 new cases. The fatal cases numbered 36, including 15 in the Metropolitan Asylum Hospitals. Measles caused 42 deaths, scarlet fever 23, diphtheria 15, whooping-cough 57, typhoid fever 27, diarrhoea and dysentery 336, and 16 from choleraic

diarrhoea and simple cholera. The deaths from diphtheria and dysentery exceed the weekly corrected average of 114. The deaths referred to diseases of the respiratory system numbered 206, and to consumption 158. Different forms of violence caused 72 deaths.

SCOTLAND.—The death-rate in the 8 principal towns for the week ending July 12 was 21.0 per 1,000. The lowest rate, 12.5, was recorded in Leith, the highest 33.6 per 1,000, in Perth.

EDINBURGH.—Deaths, 78; annual death-rate, 17.5 per 1,000. Measles and scarlet fever each caused 1 death, diphtheria 2, whooping-cough 5, diarrhoea 1, acute lung diseases 8, and violence 2.

GLASGOW.—Deaths, 229; annual death-rate, 27.5 per 1,000. Measles caused 7 deaths, scarlet fever 9, diphtheria 1, whooping-cough 11, diarrhoeal diseases 10, acute lung diseases 27, and violence 10.

IRELAND.—The average annual death-rate in the principal town districts during the week ending July 12 was 19.1 per 1,000.

DUBLIN.—Deaths, 145; annual death-rate, 25.5 per 1,000. Scarlet fever caused 3 deaths, whooping-cough 4, diphtheria 1, typhoid fever 2, consumption 27, acute lung diseases 16, and violence 6.

BELFAST.—Deaths, 70; annual death-rate, 16.8 per 1,000. Scarlet fever caused

below the average of the corresponding quarter for the past ten years. The causes of death showing increased mortality over previous quarters in the 16 towns, were scarlet fever, which caused 137 deaths, and consumption, 352 deaths.

BELGIUM—Brussels.—Week ending July 5: Deaths, 172; annual death-rate, 21.2 per 1,000. Small-pox caused 6 deaths, measles 1, scarlet fever 2, typhoid fever 1, diphtheria 1, croup 3, whooping-cough 1, diarrhoeal diseases 10, consumption 25, acute lung diseases 23, and violence 2.

AUSTRIA—Vienna.—June 22-28: Deaths, 399; annual death-rate, 27.3 per 1,000. Small-pox caused 3 deaths, measles, scarlet fever, and typhoid fever each 1, croup 3, whooping-cough 2, diarrhoeal diseases 28, and acute lung diseases 45.

RUSSIA—St. Petersburg.—June 22-28: Deaths, 495; annual death-rate, 27.4 per 1,000. Small-pox caused 1 death, measles 24, scarlet fever 2, typhoid fever 21, diphtheria 10, whooping-cough 7, diarrhoeal diseases 81, and acute lung diseases 71.

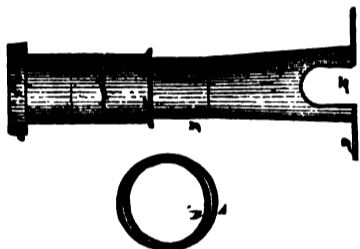
DENMARK—Copenhagen.—July 1-8: Deaths, 153; annual death-rate, 29.4 per 1,000. Measles caused 1 death, croup 1, whooping-cough 3, diarrhoeal diseases 20, consumption 17, acute lung diseases 13, and violence 3.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

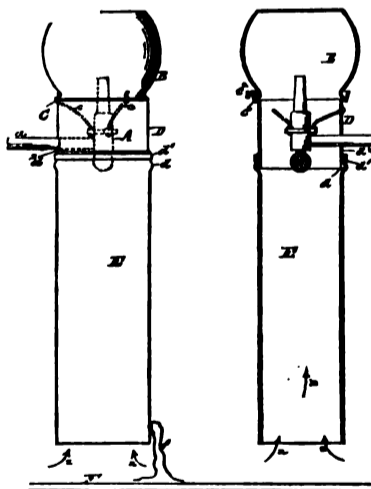
Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

296,181. STOP-COCK BOX FOR WATER OR GAS-PIPES. ALONZO R. KETCHAM, Buffalo, N. Y. Filed October 20, 1883. (No model.) Issued April 1, 1884.



Claim.—An extensible box or casing composed of two telescopic parts constructed with elliptical contiguous surfaces, substantially as set forth.

296,920. GAS-BURNER FOR HEATING AND LIGHTING ROOMS. BENJAMIN F. ENOCH, Philadelphia, Pa. Filed January 13, 1883. (No model.) Issued April 8, 1884.



Claim.—1. The combination of a gas-burner, a globe or shade therefor, and a tube inclosing said burner below the shade or globe and hanging pendent therefrom and supported thereby, substantially as shown, and for the purpose set forth.

2. In combination with a gas-burner, a globe or shade, a balcony for the globe inclosing the burner, and a flexible tube supported thereby and depending therefrom to near the floor of the apartment wherein such fixtures are located for use, substantially as described.

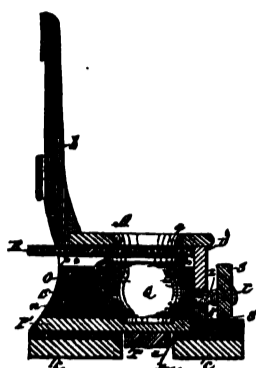
3. The tube D, having slot *a*, and provided with means for attaching it to a gas-burner, and a beaded or flaring edge, *d*, in combination with pipe or hose E, and means for attaching it to said tube, substantially as shown and described.

4. In a heating attachment for gas-burners, the combination of a tube, D, provided with means for attaching it to a gas-burner, a flexible pipe, E, and means for contracting the lower opening of said pipe, substantially as set forth.

296,580. ODORLESS PRIVY-SEAT OR CHAIR. FRANKLIN B. KENDALL, Tumwater, Wash. Filed May 25, 1883. (No model.) Issued April 8, 1884.

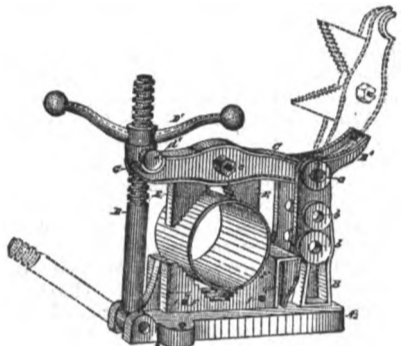
Claim.—1. In an odorless privy-seat or chair, the combination, with a vertically-reciprocating platform

supporting an excrement vessel, of levers pivoted to the supporting-frame and connected to the platform, and a step pivoted to and between the forward ends of the levers and adapted to engage with shoulders on the chair, substantially as herein shown and described, whereby the excrement-vessel is raised and lowered, as set forth.



2. The combination, with a box, O, provided with shoulders *b*, slots *c*, and recesses *m*, of the pivoted levers L, rods B, carrying the platform P, and pivoted step S, substantially as described, and for the purpose set forth.

296,898. PIPE-VICE. ALBERT H. JARECH, Erie, Pa. Filed April 12, 1883. (No model.) Issued April 8, 1884.



Claim.—In a pipe-vice, the combination, substantially as shown, of the base A with upright B, having the horn B', and pivot pin-holes *b* and *b'* and the jaw-faces G G, the pivoted jaw C with claw *c'*, and the pivoted screw D with movable block *d'* and armed nut D'.

295,522. EXCAVATING-MACHINE. THOMAS CLARK, Quincy, Ill. Filed June 22, 1883. (No model.) Issued March 25, 1884.

295,525. COMPOUND FOR WATERPROOFING AND PRESERVING BUILDINGS. BENJAMIN DE NISE, Camden, N. J., assignor of one-fourth to Joseph Chapman, Philadelphia, Pa. Filed February 21, 1884. (No specimens.) Issued March 25, 1884.

Claim.—1. The within described waterproofing compound, consisting of fossil-wax, carnauba-wax, refined paraffine-oil, and carbolic-acid, united by heat.
2. The within described waterproofing compound, consisting of fossil-wax, carnauba-wax, refined paraffine-oil, and carbolic-acid, combined in about the proportions and in the manner specified.

295,527. FIRE-ESCAPE. ROBERT EMIAH DOWNIE, Clinton, assignor of one-half to George A. Houston, Beloit, Wis. Filed November 7, 1883. (No model.) Issued March 25, 1884.

295,532. GAS-PRESSURE REGULATOR. LEWIS G. FRANCIS, La Grange, and JOHN A. TIBBS, Hinsdale, Ill. Filed December 13, 1883. (No model.) Issued March 25, 1884.

295,542. STEAM-GENERATOR. DANIEL MCBRIDE GRAHAM, Chicago, Ill., assignor to the Company of Vulcan, New York, N. Y. Filed May 29, 1883. (No model.) Issued March 25, 1884.

295,550. PROCESS OF AND APPARATUS FOR VAPORIZING HYDROCARBON OILS. HENRY F. HAYDEN, Washington, D. C. Filed August 20, 1883. (No model.) Issued March 25, 1884.

295,570. FIRE-ESCAPE. ABRAHAM W. LOZIER, New York, N. Y. Filed February 8, 1883. (No model.) Issued March 25, 1884.

295,578. STEAM-TRAP. GEORGE B. MCCracken, Willimantic, Conn. Filed August 27, 1883. (No model.) Issued March 25, 1884.

295,576. CHEMICAL CAR-WARMER. CLIFFORD MITCHELL, Chicago, Ill. Filed February 16, 1883. (No model.) Issued March 25, 1884.

295,597. ROTARY PUMP. FRANK S. TROUTMAN, Seneca Falls, N. Y. Filed March 21, 1883. (No model.) Issued March 25, 1884.

295,600. HYDRANT. BENJAMIN C. VANDUZEN, Cincinnati, O. Filed July 18, 1882. (No model.) Issued March 25, 1884.

295,604. ROOFING COMPOSITION. WELCOMBE WHITE, Everett, Mass., assignor of one half to Wm. L. Maltby, Montreal, Canada. Filed January 29, 1883. (No specimens.) Issued March 25, 1884.

Claim.—A roofing cement or composition composed of mica, asbestos, soapstone and coal-tar, or other liquid bituminous substance, united in about the proportions herein set forth and described, for the purposes specified.

295,610. WOOD PAVEMENT. ROBERT ALBRECHT, Tilsit, Prussia, Germany. Filed February 1, 1884. (No model.) Patented in England December 3, 1883, No. 5,621. Issued March 25, 1884.

295,621. WELL-BORING AND DRILLING MACHINE. ERANK DEARMIN, De Witt, Mo. Filed November 7, 1883. (No model.) Issued March 25, 1884.

295,622. VALVE-GEAR FOR HYDRAULIC-PUMPS. GEORGE W. DICKIE, San Francisco, Cal. Filed March 21, 1882. (No model.) Issued March 25, 1884.

295,631. FIRE-ESCAPE. LAURA J. GOTT, La Grange, O. Filed January 31, 1884. (No model.) Issued March 25, 1884.

295,639. HOLLOW PISTON-PUMP. JACOB F. HESS, FREDERICK H. SNYDER, LENERD HESS, JACOB F. SNYDER, and CHARLES F. SNYDER, Masillon, O. Filed March 13, 1883. (No model.) Issued March 25, 1884.

295,651. SAFETY ATTACHMENT FOR VAPOR-BURNERS. ROLAND S. KELSEY, Syracuse, N. Y. Filed August 24, 1883. (No model.) Issued March 25, 1884.

295,663. COMBINED HEATING APPARATUS AND DRYING-RACK. JACOB R. MOORE, Clayton, Mich., assignor of one-half to Henry Bovee, same place. Filed June 27, 1883. (No model.) Issued March 25, 1884.

295,666. HOT-AIR OIL-LAMP. CHARLES H. MURRAY, Leadville, Col. Filed November 24, 1882. (No model.) Issued March 25, 1884.

295,694. RATCHET-DRILL. JOHN H. VINTON, Boston, Mass., assignor to the Ashcroft Manufacturing Company, same place. Filed October 13, 1883. (No model.) Issued March 25, 1884.

295,700. STEAM-RADIATOR. ELISHA T. WEYMOUTH, Brooklyn, N. Y. Filed August 4, 1883. (No model.) Issued March 25, 1884.

295,784. PUMP. LUIS G. CAREAGA Y SAENZ, Pueblo, Mexico. Filed May 5, 1883. (No model.) Patented in Mexico December 17, 1877. Issued March 25, 1884.

295,748. ASBESTOS JOINT-PACKING. WILLIAM ARMSTRONG FRIES, Philadelphia, Pa. Filed April 30, 1883. (Model.) Issued March 25, 1884.

295,749. ASBESTOS STEAM-PACKING. WILLIAM ARMSTRONG FRIES, Brooklyn, N. Y. Filed January 31, 1883. (Model.) Issued March 25, 1884.

295,784. GAS-ENGINE. HIRAM S. MAXIM, Paris, France. Filed June 13, 1883. (No model.) Patented in France January 16, 1883, No. 153,138, and in England February 23, 1883, No. 999. Issued March 25, 1884.

295,797. RATCHET-WRENCH. ADELBERT E. OSBORN, Waco, Tex., assignor to the Model Machine Company, same place. Filed December 31, 1883. (No model.) Issued March 25, 1884.

295,822. APPARATUS FOR MANUFACTURING ILLUMINATING-GAS. JAMES JOHN SHEDLOCK, Barnet, county of Hertford, England. Filed October 9, 1882. (No model.) Patented in Belgium June 24, 1878, No. 45,512; in England June 25, 1878, No. 2,533; in France June 25, 1878, No. 125,278; and in Germany March 28, 1879, No. 7,287. Issued March 25, 1884.

295,832. PROCESS OF AND APPARATUS FOR MANUFACTURING GAS. JOHN L. STEWART, Philadelphia, Pa. Filed March 23, 1883. (No model.) Issued March 25, 1884.

295,842. APPARATUS FOR AND PROCESS OF CONSUMING SMOKE. WILLIAM VOGEL, Chicago, Ill., assignor to G. A. Woolley, same place. Filed December 28, 1883. (No model.) Issued March 25, 1884.

295,854. BOILER-SCRAPER. JOSEPH HENRY BEARE, Tombstone, Ariz. Filed July 28, 1883. (No model.) Issued March 25, 1884.

295,871. BRICK AND TILE MACHINE. ABRAHAM HORROCKS, Bardolph, Ill. Filed April 23, 1883. (No model.) Issued March 25, 1884.

295,876. ANTISEPTIC SOLUTION. JOHN F. KENNEDY, Boston, Mass. Filed October 15, 1883. (No specimens.) Issued March 25, 1884.

Claim.—The herein-described compound, consisting of water, alum, granulated sugar, saltpetre, and gum-arabic, for the purpose specified.

295,881. WATERPROOFING COMPOSITION. ALBERT MINK, Newark, N. J., assignor to Christian F. Mueller, same place. Filed July 23, 1883. (No specimens.) Issued March 25, 1884.

Claim.—The waterproofing composition formed of tallow, rosin, creosote, rape-seed, and ammonia, combined substantially in the manner and proportions herein specified.

295,885. PIPE-TONGS. HERBERT S. PULLMAN, Rockville, assignor to Charles F. Billings, Hartford, Conn. Filed February 6, 1884. (No model.) Issued March 25, 1884.

295,890. PURIFYING WATER. WM. TWEEDDALE, Topeka, Kan. Filed July 31, 1883. (No model.) Issued March 25, 1884.

296,001. PUMP. ORLIN W. HAMMOND, Belmont, N. Y. Filed September 1, 1883. (No model.) Issued April 1, 1884.

296,088. REVERBERATORY GAS-FURNACE. WILLIAM L. MCNAIR, Golden, Colo. Filed July 25, 1883. (No model.) Patented in Canada November 2, 1883, No. 18,015, and in England November 27, 1883, No. 5,551. Issued April 1, 1884.

296,044. EARTH-SCRAPER. JOHN F. O'CONNOR and STERLING M. WILLIAMS, Davenport, Iowa. Filed June 30, 1883. (No model.) Issued April 1, 1884.

296,098. HOSE-COUPLING. THOMAS E. WELLS, Sandy Hill, N. Y. Filed May 3, 1883. (No model.) Issued April 1, 1884.

296,131. PAVING-BLOCK. ROBERT CAMPBELL, Wheeling, W. Va., assignor to himself and George Baird, same place, and John Porter, New Cumberland, W. Va. Filed December 5, 1883. (No model.) Issued April 1, 1884.

296,147. VAPOR-BURNER. ZEBULON DAVIS, Canton, Ohio. Filed December 8, 1882. (No model.) Issued April 1, 1884.

296,200. PROCESS OF MANUFACTURING HYDROCARBON GAS. WILLIAM FITZ CHARLES MASON McCARTY, St. Petersburg, Russia, assignor of one-half to Henry Lewis, Philadelphia, Pa. Filed December 21, 1883. (No model.) Issued April 1, 1884.

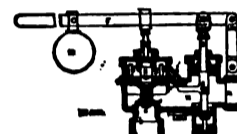
296,201. APPARATUS FOR THE MANUFACTURE OF HYDROCARBON GAS. WILLIAM FITZ CHARLES MASON McCARTY, St. Petersburg, Russia, assignor of one-half to Henry Lewis, Philadelphia, Pa. Filed December 21, 1883. (No model.) Issued April 1, 1884.

296,145. FIRE-ESCAPE LADDER. SAMUEL E. DAVIS, Joliet, Ill., assignor of one-half to Edward A. Boaz, same place. Filed June 6, 1883. (No model.) Issued April 1, 1884.

296,175. SUPERHEATER. GOMER JONES, Washington, D. C., assignor to the Standard Vapor Fuel Iron and Steel Company of New York. Filed January 4, 1884. (No model.) Issued April 1, 1884.

English Patents.

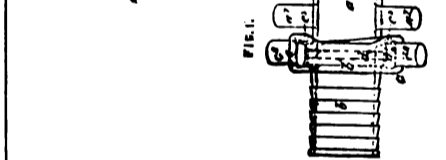
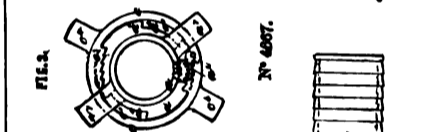
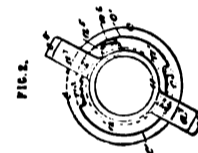
4,651. IMPROVEMENTS IN VALVES FOR REGULATING THE FLOW AND PRESSURE OF LIQUIDS AND FLUIDS.



WILLIAM HENRY BAILEY, hydraulic engineer and brassfounder, and WILLIAM LAWSON, manager, both of Salford, in the county of Lancaster.

Prov. Spec. September 29, 1883. Letters patented March 29, 1884. (Price 6d.)

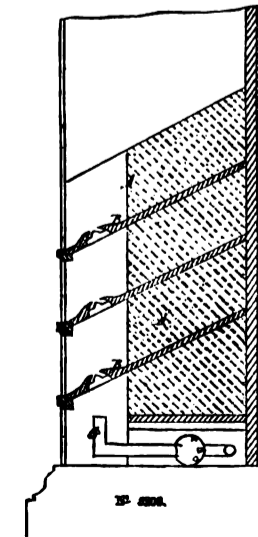
4,667. IMPROVEMENTS IN UNIONS OR COUPLINGS FOR PIPES, HOSE, AND OTHER ARTICLES.



This invention has for its object improvements in unions or couplings for pipes, hose, and other articles, and relates to a novel construction of parts whereby great facility is afforded for connecting and disconnecting two lengths of pipe or hose, or for coupling together other articles, whilst after the joint has been effected the two lengths or articles are prevented from becoming accidentally disconnected.

NATHAN THOMPSON, of 23 Southampton Buildings in the County of Middlesex. Prov. Spec. October 1, 1883. Letters patented April 1, 1884. (Price 6d.)

5,209. GAS FIRE.
1. CHARLES CARR WILSON, of the firm of Charles Wilson & Sons, of Carlton Street, Leeds, in the county of York, gas engineer, do hereby declare the nature of my invention for gas fire, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, that is to say:



Complete Specification March 20, 1884. (Price 4d.)

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THE SANITARY ENGINEER.

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NUMBER 11.

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THE WATER-SUPPLY OF ENGLAND.

IN a recent letter to the London *Times*, Mr. Baldwin Latham, the well-known engineer, calls attention to the present low level of the ground-water in certain parts of England, and the danger from typhoid fever when the supply increases. He states that "in the east and southeast districts of England there is a very marked deficiency of water, and there is likely to be such a dearth of water in these districts as has not been experienced for many years past." He also predicts a smaller flow than usual in the Thames, and especially in its tributary, the Lea, and states that "from records of underground water it appears that there is a marked deficiency of water in the ground every ten years; for instance, there was a deficiency in 1854, 1864, 1874, and, in all probability, this low water will occur again this year." Although we are disposed to be skeptical as to Mr. Latham's prophesies, and especially as to his announcement of a regular ten-year period of fluctuation of ground-water levels, and think that if the records of gaugings on which he has based his conclusions were produced it would be found that they give a small foundation for such sweeping deductions, there can be no doubt that the matter is one of great interest, and that his caution as to the use of well-water after heavy rains following a long dry spell is well founded.

THE MASTER PLUMBERS' NATIONAL ASSOCIATION.

THE proposition of Mr. Andrew Young, President of the Master Plumbers' National Association, that local associations co-operate with health officials, is bringing responses from all parts of the country.

Mr. Young has received communications in reference to it from Texas and also from Canada. From this latter dominion, it is now assured, representatives will be present at the St. Louis meeting of the National Association in 1885. Montreal and Toronto have both been in correspondence with the president of that association.

It also has been decided by the Executive Committee of the National Association to hold a committee meeting in St. Louis at the time of the October meeting there of the American Public Health Association. This, we assume, will be made the opportunity of some expression of opinions by the Executive Committee as to a system of State Sanitary Inspection in which plumbers shall take an active part.

Here is to be noted the result of the action taken at the Chicago meeting of the Executive Committee, July 24, instructing Mr. James Allison, of Cincinnati, to communicate with the conference on cholera prevention, which was called to meet at Washington last week. This conference, it will be remembered, was postponed on account of favorable reports from the cholera-stricken cities of France. Mr. Allison had, however, before the postponement was published, addressed a letter to the Hon. Erastus Brooks, offering the co-operation of the National Association in carrying out the recommendations of the conference.

THE Executive Committee of the National Association has recommended a plan to enlarge the influence of local master plumbers' associations, which seems eminently wise. It is already in

operation in Boston, Chicago, and Hudson County, New Jersey, and is briefly the opening of the associations in the large cities to plumbers living in the small neighboring towns, where the trade is too weak to organize. In this way Boston now is the headquarters for the outlying towns, and Chicago draws members from eighteen miles distant. If the system is adopted by other of the larger cities, the membership will certainly be much increased, and the number of towns represented in the National Association will be materially enlarged. What a measure of this kind would do for the New York Association can be seen by considering the number of thriving towns on the line of the Hudson River Railway alone, within easy access, whither local associations are too weak to thrive alone, and hence no organization exists.

A POISONOUS WELL.

WITHIN a few days the serious illness of several members of a Yonkers, N. Y., family, first supposed to be due to unwholesome food, has been, in the opinion of the physicians, traced to a well poisoned by leakage from a privy-vault. The reports so far published state that every person in the house was attacked.

The physicians satisfied themselves that the food was not responsible, and then turned their attention to the water. This was found to be drawn from a brick cistern within five feet of which was the privy-vault. This is a striking instance of the danger of cesspools and vaults so often pointed out. This Yonkers family we may be certain has now thoroughly learned the truth of some sanitary precepts. Experience is sometimes a dear teacher, but it is often effectual where all other instruction fails.

IS IT LEGAL TO CHARGE A STATIONARY ENGINEER A FEE FOR HIS CERTIFICATE?

THE law empowers a bureau of the Police Department of this city to examine stationary engineers as to their fitness and ability to take charge of engines and boilers, and issue certificates of qualification, if, in the judgment of the examining engineer, the applicant has a sufficient knowledge of engineering, coupled with some practical experience, for the particular position he is to occupy.

Previous to the last meeting of the Legislature the certificate partook of the nature of a permit to take charge of boilers, etc., and to perform the duties of an engineer at a certain premises, the man being examined with a view to his fitness for the particular place. For the issuing of this "certificate" no charge was made, presumably because the regulation was like any other police duty, for the public good, and for which the public alike bore the expense.

An act of the last Legislature amended the police law in this respect, giving the sanitary bureau of the department the power to issue classified certificates to engineers, grading them into first, second, and third classes, according to the ability of the applicants, and charging them a fee of \$2 for the certificate and for each yearly renewal.

To the payment of this fee the engineers of New York City take exception, on the ground that it is illegal, and, we believe, are organizing with a view to test the constitutionality of it.

One man, Joel W. Hooper, has made an application to Judge Bartlett, in Supreme Court Chambers, to compel the Commissioners of Police to issue to him a certificate, he having qualified and been accepted as competent, but refuses to pay the fee, on the ground that engineers should not be assessed for the benefit of the Police Pension Fund.

SANITARY NOTES.

AN epidemic of diphtheria is at present raging at Hamilton, Ont., and its victims are to be found in the south-western part of the city, which has always been considered one of the healthiest localities. As to the cause of the disease, various theories have been advanced, among them defective sewerage and faulty plumbing in the residence where the disease has been discovered. The west-end sewer comes in for a fair share of blame, as well as milk which has been supplied to residents in the district named. The physicians advise all parents and others to examine their children's throats several times during the day, and gargle their throats with a weak solution of salt and water. The epidemic is directing the attention of the authorities to the connecting of houses with sewers already built, for at present a landlord is not compelled to make the connection, and the result is that a sewer may run along a given street, but for the lack of that connection the tenant derives no benefit from the sewerage, and the sewer, so far as these houses are concerned, might as well never have been built.

AN investigation of the sources of pollution of Wissahickon Creek has just been completed by Assistant Engineer Dana C. Barber, and submitted to Chief Engineer Ludlow, of the Water Department of Philadelphia, who will present it at the next meeting of Councils. The chief causes of pollution are within the city limits, the drainage of the hotels along the creek being especially objectionable. Half a dozen hotels, with drains directly connected with the Wissahickon, are the cause of serious and offensive pollution to the waters. On Cresheim Creek several houses on Germantown Avenue aid in the pollution, as their drains are connected with this tributary of the Wissahickon, and below Germantown the shoddy mills of David Kelly, says the report, "are surrounded by very filthy yards, and several houses contribute much pollution to the stream, these having wells with loose stone vaults close to a small tributary of the creek, and throwing kitchen waste near the banks."

A HARTFORD alderman has risen in his wrath and declared his right to be as dirty as he chooses to be without interference. The occasion was the discussion of the health ordinance pending in Common Council, July 15. No such invasion of the sanctity of the home as was proposed by the ordinance had been known, according to our alderman, for three centuries. It was clearly a violation of the provision of the Constitution of the United States, which declares every man's house his castle.

THE Board of Health, of Providence, R. I., has declared quarantine against all vessels from foreign ports, except those of British America.

A SUB-COMMITTEE of five has been appointed by the Committee on Public Buildings of the Court Board, St. Paul, Minn., to look into the cost of a morgue and report plans of construction.

THE publishers of the *Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege* have begun the issue of an annual record of the progress of public hygiene under the title of *Jahresbericht über die Fortschritte und Leistungen auf dem Gebiete der Hygiene im Jahre, 1883*. The editor is Dr. J. Uffmann, of Rostock, and this first annual volume contains 244 pages.

THE cholera scourge now prevailing in Europe calls to mind the experience of Boston in 1849.* At this time the population of Boston was about 135,000. The total number of cases of cholera coming under the direct supervision of the Board of Health was 707; of this number 611 proved fatal; 385 were males and 322 females. There were a very large number of cases besides those of which there was no record kept.

* Figures taken from the report of the Committee of International Health on the Asiatic Cholera in Boston in 1849.

OUR BRITISH CORRESPONDENCE.

Selling Unwholesome Meat—Proposed Cholera Commission—Captain Douglas Galton on Coal-Fires—Ventilating the Sewers—The Hospital Fête—Electric-Lamps for Iron Works—Scarlet Fever Epidemic at Leek—Mortality from Cholera at Toulon.

LONDON, July 26, 1884.

SEVERAL cases have been before the police courts lately, in various districts, of selling food unfit for human consumption. One of the worst of the kind was the case of a butcher at Stoke, who was a day or two back fined £10 and costs for having in his possession two hundredweight of meat which was unfit for human food. The Medical Officer of Health said that the meat was so bad that when a piece was taken up on the end of a stick it fell to pieces of its own weight. The only defense the man could offer was that the meat was intended for pig's food.

The *British Medical Journal* is responsible for the statement that the Government intends instructing an eminent pathologist and physiologist connected with one of the London hospitals, and whose work in the investigation of minute organisms related to disease is of recognized authority, to proceed to India for the purpose of investigating the pathology and causation of cholera.

Captain Douglas Galton, in his lecture on "Ventilation in Connection with Warmth and Lighting," before a crowded audience at the Exhibition last week, said the amount of coal consumed in London was out of all proportion to the heat produced. The open fire was the most wasteful method for warming a room, though it was a great engine of ventilation. He suggested that buildings should be warmed by means of hot air or steam-pipes from a fire in a central position, or by means of gas. In the United States the system of heating by hot air, he stated, was now becoming universal.

At the meeting of the City Commissioners of Sewers, held at the Guildhall on Tuesday last, the following resolution, proposed by Mr. Scott and seconded by Mr. Boor, was carried: "That in all instances where new houses were being erected, the Commissioners of Sewers should place themselves in communication with the building or other owner, and treat with him or them for the construction of a proper ventilating-shaft in the chimney-breasts or party or other walls, for the purpose of ventilating the sewers, carrying the ventilating-shafts well above all the adjoining roofs."

Mr. Rose-Innes, the chairman of the Sewers Commission, states that if any resident in the city has cause to complain of any smell from the city sewers, he has only to procure the consent of the owner of the adjacent property, and the Sewers Commission will, without delay, put up a ventilating-shaft, free of expense.

The hospital fête at the Health Exhibition on Wednesday last was a great success. The grounds looked remarkably well, with the thousands of colored lights, the illuminated fountains, and the electric-light, and everything passed off most successfully. Though not inconveniently crowded, the place was quite full of people, and considering the rather high price of admission—viz., ten shillings—it is to be hoped the London hospitals will reap a substantial benefit from the fête. The dairy and flower stalls were presided over by members of the nobility, and a good business was done in selling milk, fruit, and flowers, the prices asked and received being considerably in excess of the intrinsic value of the articles sold. A novel effect was produced by exhibiting two of the Guernsey heifers at the Express Dairy Company's stall, ornamented with electric-lights on their heads, the necessary machinery for the lights being concealed in a wreath of flowers placed around the animals' necks.

The new British Iron Company (Limited) now light their works at Corngreaves, near Cradley, with the Weston arc-light, the electrical plant being supplied by the Maxim-Weston Electric Company. The installation of the electric-light is said to have proved most successful, both as regards efficiency and economy, as compared with gas.

At a recent meeting of the guardians of Leek, when the scarlet fever epidemic came up for discussion, a sanitary inspector reported that he had found in the rural district a case being treated in a room where cheese was stored ready for market; another where the person in the height of the

fever was making cheese; at a third, where the person affected was milking cows; and a fourth, where an attendant upon a very bad case was preparing a large quantity of milk for the railway station. The disclosures, it is said, have actually "created quite a sensation in Leek, where the dairy produce is mainly consumed, and where scarlet fever has recently been largely prevalent." A still more outrageous disregard of sanitary common-sense was spoken of at the water-supply conference the other day. Certain well-to-do people in the neighborhood of Liverpool found their wells going dry, and it became evident that the pumping from one of the corporation wells was the cause. Eventually the owners of the wells were obliged to take water from the corporation, but in order to utilize the wells which were useless for the purpose for which they were dug, they were converted into cesspools, and the liquid house refuse allowed to soak away into them, in spite of the known connection with the well from which the water-supply was pumped!

Dr. E. Janssens, the Chief of the Health Department of the City of Brussels, has made a computation of the mortality from cholera at Toulon, in the epidemics of 1835, 1849, and 1884. In 1835 the deaths were 4.8 per cent. per 1,000 inhabitants; in 1849, 14.0 per 1,000; in 1884, 47.0 per 1,000. This is a severe commentary, certainly, on the cumulative effects of continued insanitary conditions.

SAFETY-VALVE.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. VI.

(Continued from page 218.)

FIGURES 15 and 17 are views in two of the bath-rooms in the Marquand house.

Figure 15 represents a plunge-bath on the third story. It is made of Tennessee marble slabs, 2½ inches thick, rabbeted together at the corners. The sides are let into the bottom and the ends into the sides and bottom, the whole being bound together with brass rods and bars. At the end of the bath which is toward the foreground of the picture, egress from the water is by three steps. The floor of the room and the wainscoting to the height of four feet six inches is also of Tennessee marble of various shades combined for effect. At the right is shown a wash-bowl, the wood-work of which is rosewood, as are the two panel-doors which cover the "chases" above the wainscoting. The panels at the end and front of the wash-bowl stand are hinged in such a manner as to be readily unhung for the purpose of inspection or repairs. The large slab at the head of the plunge-bath, which forms a boxing for the valves and pipes and a concealed overflow, can be taken off by the removal of four screws, giving access for inspection and repairs in this direction.

Figure 16 shows the underside of the same plunge-bath as it appears in a closet immediately under the bath-room. The "chase" seen here with the door ajar is the continuation of that shown at the left in Fig. 15. In it is the soil-pipe *e*, the air-pipe *h*, the hot-water pipe *g*, and the cold-water pipe *f*, and the safe-waste. The trap *b*, the valve-pipe *c*, and the overflow-pipe *a* are the pipes mentioned as being capable of inspection at their upper ends when the slab is removed at the head of the bath. The trap used here is a "bottle-trap," as shown, access to which is through a screw at the bottom. The waste-connection from the bath is also provided with a cleaning-screw at its first bend, as shown, near *f*. The rods *l* are brass binding-bolts, before mentioned, but the bars *k* are iron supports attached to the floor-joists above and simply arranged to take the distributed weight of the bath. This is adjusted by hardwood wedges under the edges of the sides. The panel shown at the left forms a bottom for the hardwood casing when in place and is arranged to be easily removed. The panels of the "chases" throughout the house are lined on this inside with galvanized-iron, and hung similar to a door, with lock and handles to facilitate inspection.

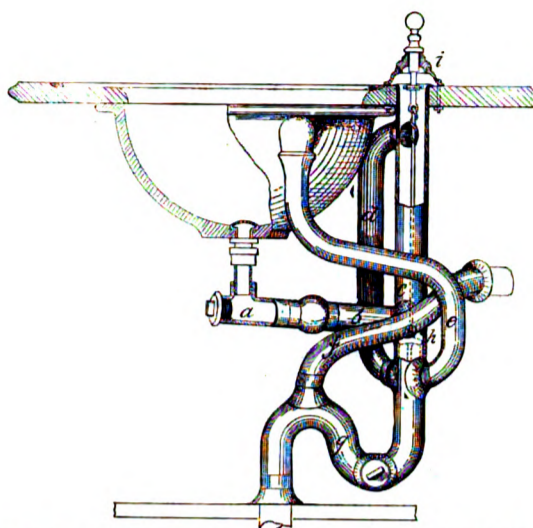


FIGURE 18.—DETAIL OF LEAD-WORK ABOUT BASINS.

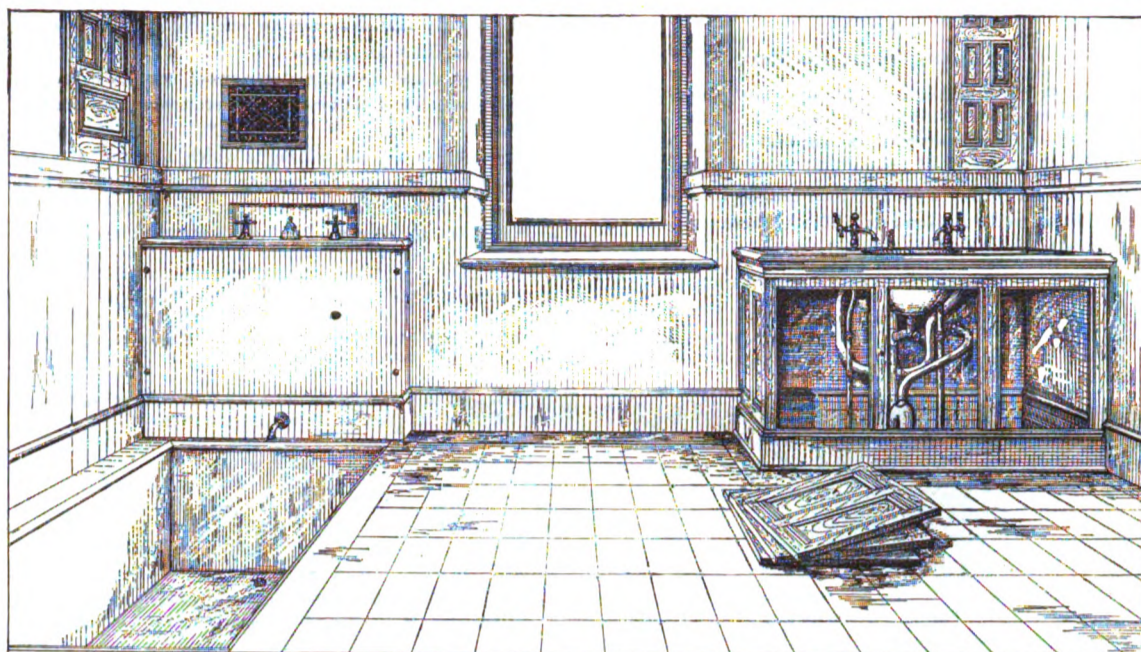


FIGURE 15.—MARBLE PLUNGE-BATH.

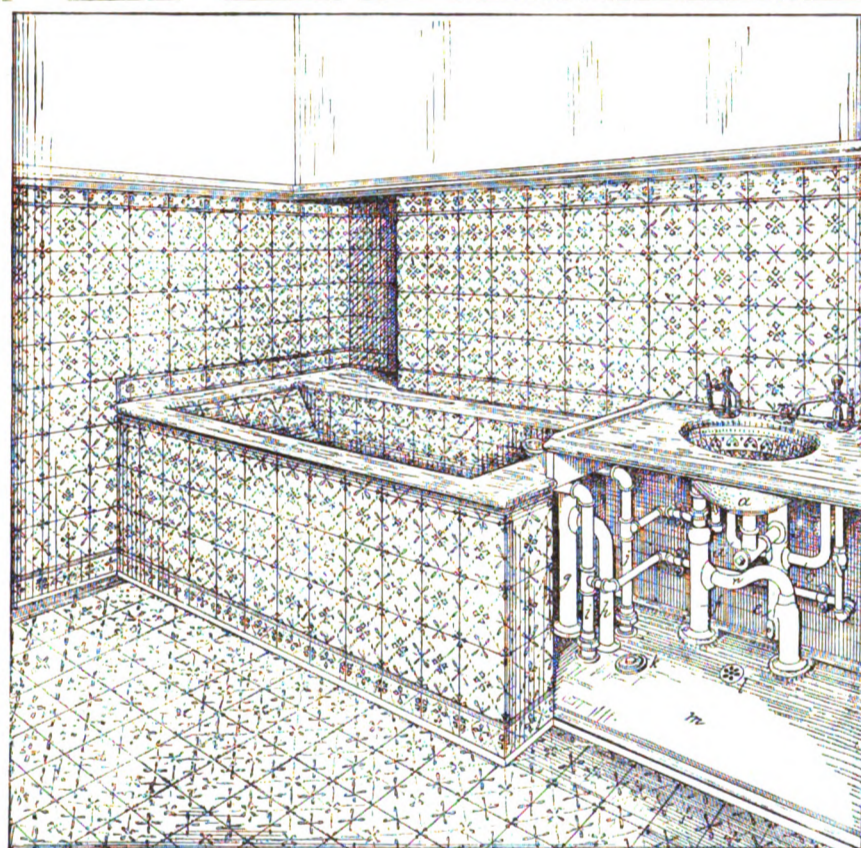


FIGURE 17.—CHINA BATH.

Figure 17 represents a soapstone bath, which is rabbeted and put together with screws, after which it is lined inside and cased outside with tiling similar to the floor and wainscoting, the prevailing color being blue. The detail of the plumbing fixtures are very well brought out in the cut, and need very little explanation from us. The pipe *g* at the end of the tub contains the valve and pull-rod, *h* being the overflow-pipe. At *k* in the marble safe is a 3-inch cleaning-screw, leading to a bottle-trap under the floor, *f* being the back-air pipe from the same trap. The pipes *i* and *j* are respectively cold and hot-water supply.

Figure 18 shows the principle of waste-piping used to basins and baths throughout the house with a single exception, the sketch being a detail of a basin on the third floor. The fitting *a* is made of brass with a cleaning-screw in the "run," the side being tapped to take the "tail-screw" of the basin-coupling. This is pieced out with lead pipe (*b*) to suit the distance to the valve-pipe *c*. In addition to the basin-overflow, *e*, is a concealed overflow *d*, which is used to give additional support to the pipe *c*, and give greater capacity or provide another passage should *c* be temporarily stopped. The seat of the valve *h*, which must be

in the pipes *c* between the junctions of the pipes *b* and *c*, is inserted into the pipe, which is cut for the purpose, the ends being reunited again by "burning." To withdraw the valve *h*, the nut *i* may be unscrewed, when the whole can be lifted out.

(TO BE CONTINUED.)

THE GERM THEORY.

THE advocates of the germ theory hold that those diseases which are known as zymotic are the result within the body of minute organisms which bear a resemblance to those which produce fermentation. In the case of two of the zymotic diseases—viz., cholera and enteric fever, and these are the most destructive of the entire class—it has been proved beyond doubt that water contaminated with sewage which has been infected by patients suffering from these diseases is capable of producing the same class of disease among those who drink the infected water. This is now so thoroughly recognized that the dread of epidemics is to some extent lessened by sanitary precautions; and a great deal more good would be done by introducing a pure water-supply. The one great question which will

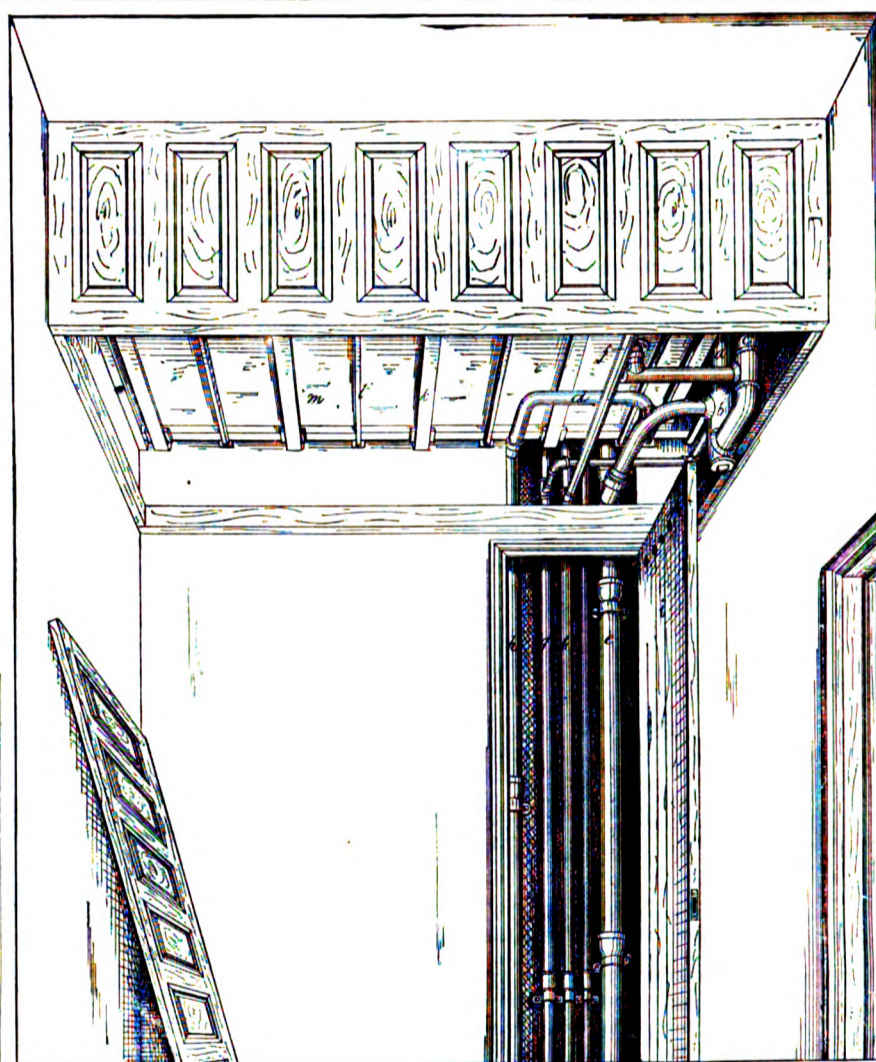


FIGURE 16.—PIPING UNDER PLUNGE-BATH.

for the future engross the public mind, is how infectious disease is spread. On this subject we can only remark that we must first of all look to our surroundings at home; next to what we eat and drink, and we must carefully distinguish between fancy and reality; in a word, we must go to the feeding-ground of our supplies, and find out if the source is good and healthy, and then trace it to its destination. It may be well to go a little further and examine your homes, the method of cooking, and the water-supply, as well as the place in which the supply was kept before using. These remarks especially apply to one commodity—milk; for, if originally pure, it may be made infectious and the direct medium for the propagation of disease. This infection may be acquired by means of adulterations, or dirty vessels, or by being kept in a polluted atmosphere, or in places where infection can be acquired.—*Dr. T. B. Moriarty's Address at Cork Hospital.*

THE Jacksonville, Fla., Board of Health has chosen the following officers: President, Dr. C. Drew; Vice-President, Dr. Hy. Robinson; Secretary, Dr. A. W. Knight.

HEALTHY FOUNDATIONS.

No. XI.

BY GLENN BROWN, ARCHITECT.

"He who builds a fair house upon an ill seat committeth himself to prison."—BACON, vol. i., page 49.

(Continued from page 194.)

Impervious Coatings.—Brick and stone walls that would absorb water require an impervious coating on the outside, in addition to the broken-stone filling, where there is a sign of moisture in the soil or sub-soil.



FIG. 38.—DWARF-WALL.
a, Damp-proof course; b, main-wall; c, dwarf-wall; d, concrete; e, tile-drain.

For this purpose numerous expedients have been tried; enameled or glazed brick, with joints laid in asphalt and fine sand, or with joints laid in Portland cement mixed with same quantity of clean fine sand; an excellent method, but too expensive for ordinary use. Bricks have been made for the purpose with glass in their centre, and asphalt or other bituminous material mixed with sand has been molded in the form of damp-proof brick.

Glazed terra-cotta slabs, worked in so as to protect the wall, were introduced into England by Follet in 1869. Facing walls with non-absorbing materials is common in Germany, density and non-absorbency going hand-in-hand.

An effectual impervious facing is given to the wall by using Taylor's or Doulton's damp-proof courses, made of vitrified or glazed stoneware (Fig. 39). The tile must be laid with the vitrified surface on the outside, next to the embankment.

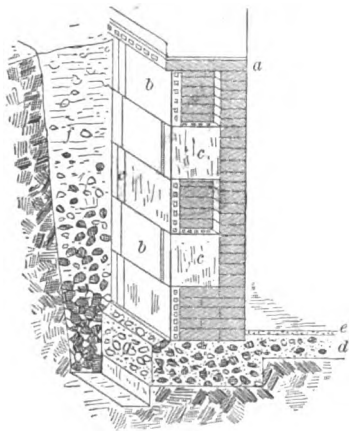


FIG. 39.
a, Damp-proof course; b, tile-facing; c, bond-tile; d, concrete footing and cellar bottom; e, asphalt coat; f, broken-stone filling.

The tile may be tied into the wall either by iron clamps (asphalted or galvanized), or the tile may be built into the wall so that every other tile will have its narrow edge outside and run back its full depth into the wall. The holes which run through the tile must open on the outside, as they would form conduits through which water could run into the wall. Joints should be made with asphalt or cement and fine sand.

Cheap Facings.—The cheap methods of protecting the face of a wall where it is below the surface are by facing it with slate laid in cement-mortar, plastering it with cement-mortar, or coating it with asphalt-mastic, gas-tar, or pitch. Asphalt requires a smooth surface, so the wall should be plastered first with cement-mortar. Gas-tar and pitch must be applied in a boiling state, and the bricks must be perfectly dry, and it is better to have them heated. Cement may crack and slate become disjointed, while bitumens, mineral or organic, have a certain elasticity to them which makes them valuable.

Damp-Proof Courses.—Impervious courses are introduced into brick or other absorbent walls to prevent moisture that would come through the footings or other unprotected parts of the wall which are below the surface of the ground from rising into the wall above. Such courses are called damp-

proof, and are inserted just above the ground line, and when properly laid they are an effective barrier to water rising by capillary attraction.

The Taylor and Doulton damp-proof courses (Fig. 40), made hollow and of highly-vitrified stoneware, are used in England.

The Doulton tile has a tongue which fits into a corresponding groove in the tile next to it in the course. These tiles are made so as to cover the entire width of the wall, and must be jointed with Portland cement or asphalt and sand.

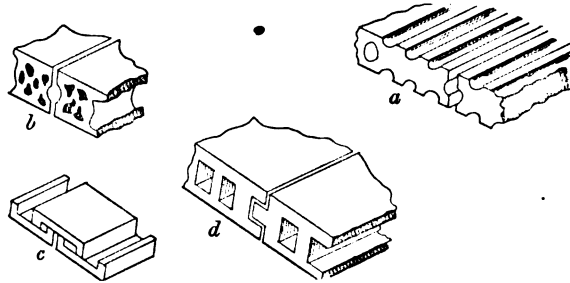


FIG. 40.
a and b, Taylor's tile, damp-proof courses; c, an early form of damp-proof tile; d, Doulton's tile, tongue and grooved joint.

The holes which run through all these tiles may be utilized for ventilation.

Sheet-lead, cut the width or thickness of the wall, weight five or six pounds per superficial foot, makes an excellent but expensive damp-proof course (Fig. 35A). At the joint the lead should be carried down in a vertical joint and lapped. A solder joint might break, either from expansion or contraction or by settlement in the masonry. Hot asphalt mixed with sand, one-half to three-quarters of an inch thick, makes a good damp-proof course. Portland cement mixed with sand, about one-half of an inch thick, is sometimes used as a damp-proof, but it is liable to crack, and thus prove ineffectual.

Slate (Fig. 34A), laid in cement, two courses deep, in which the top course covers the joint of the bottom course, is the damp-proof course used almost universally in this country and in England. Slate, when carefully bedded in cement, will not break unless there is an unusual settlement in the foundation. When the slate laps the joints properly, it makes a damp-proof course, which serves its purpose well, and will not be superseded except in expensive buildings.

Interior Coating.—Treatment of the interior face of the wall, except in connection with the treatment of the exterior, or to protect plastering or frescoing from stain, amounts to nothing more than covering the evil up to keep it out of sight. The damp wall, with its evil effects, are unremoved.

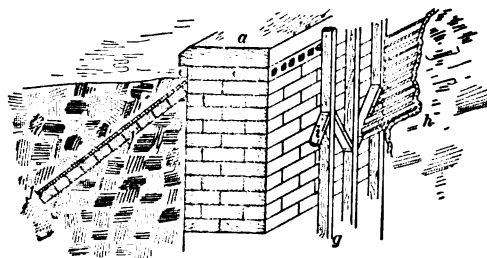


FIG. 41.
a, Wall; c, damp-proof course; f, water-shed; g, studding; h, lath and plaster.

Many quack remedies have been devised, each of which, according to the inventor, is perfect. The interior (as a sure cure) surface has been covered with tin-foil or oil-cloths. Glass veneer has been tried in France and Germany, the glass being held in position by litharge plaster or cement. The walls have been coated with paints of many compounds—alums, soaps, silicates, and cements or asphalt, all have been tried. The water is merely dammed up, the wall is wet, and the water will, eventually, find its way through.

When it is desirable to treat the wall, so as to insure the protection of frescoing, the wall may be studded (Fig. 41).

The studs being independent of the wall (two by four inches in section), are stiff enough to plaster on. The space between studs should be filled in solid at the top and bottom with two or three courses of brick to prevent the spread of fire.

In this way an air-space is formed that will add materially to the comfort of the house. This plan may be adopted in connection with some of the treatments mentioned for the outside of the wall with advantage.

Water-Sheds.—Sometimes water-sheds are placed beneath the surface to carry off the water that runs down the side of the building, or falls directly over the shed (Fig. 41). The shed is composed of a course of bricks laid against the building near the surface, and running off into the ground at an angle of forty-five degrees, and extending to a distance of two or three feet from the building line. The shed must be covered with some impervious material, such as slate laid in cement or a coating of cement or asphalt and sand, the slate cover being, probably, the best. The first course must be laid in a groove, cut or left in the wall for that purpose. The shed should be built on concrete or boards (in some cases) where the foundation is bad and liable to settle.

Water-sheds are sometimes advantageously placed above ground; in that case they take the form of either an asphalt or concrete pavement. Where the ground is sandy or gravelly, a shed of this kind is useful, as it carries the surface-water well away from the building before it soaks into the ground.

Areas.—One of the most common and effectual methods of protecting an outside wall from dampness or moisture is by means of an area. Areas may be concealed, being covered with earth and connected with the main wall at the top, or they may be open—that is, entirely independent of the building.

French Treatment.—Viollet le Duc describes a method for checking a flow of water that would otherwise run against and into the foundation, by means of a concealed passageway or area (Fig. 42). This area is intended to intercept any water that might flow along a rocky or other impervious stratum toward the building.

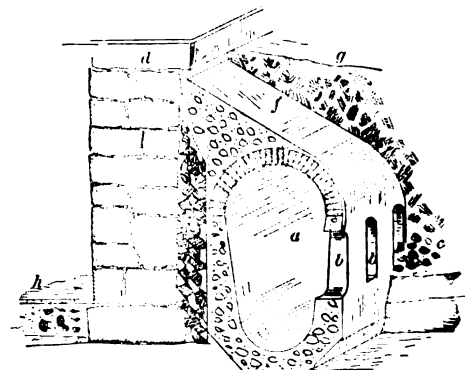


FIG. 42.—FRENCH AREA OR INTERCEPTING-DRAIN.
a, Area; b, openings; c, stone filling; d, impervious-stone water-shed; e, concrete, impervious stratum, loose stone between area and building.

The passageway is made of concrete, in the form of an egg shaped sewer, with an arch of stone or brick for its crown.

A slanting surface of concrete extends from the building line to the outside edge of the sewer. In this way a water-shed is formed that would throw the surface-water away from the building. On the side of this conduit, away from the building, there is a row of long narrow openings or slits against which stone are piled. The water that runs along the impervious stratum is intercepted and enters the passage by the open slits, and may be conveyed away as described in a previous article.

These passageways may be entirely independent of the wall, the space between being filled with broken stone, or the foundation-wall may be used as the interior wall of the conduit (Fig. 43). The first method would protect the building better than the latter, while the latter would be the cheaper.



FIG. 43.—FRENCH INTERCEPTING-DRAIN.—A STONE STRATUM.
a, Stone stratum; c, foundation area forming part of wall; b, common earth.

(TO BE CONTINUED.)

THE Board of Health of Hudson County, N. J., is at loggerheads with the Board of Health of Jersey City over the suppression of the sale of steamer bedding. The County Board is trying to prevent the sale of it to the dealers, who profess to renovate the straw and then resell it, while the City Board is giving licenses to the same dealers.

SEWAGE DISPOSAL AT FLORENCE, ITALY.

MANY Americans visit Florence, and the following brief description of the methods of removing human waste matter, which is sent us by a civil engineer who formerly resided in Italy, may be of interest.

Florence contains a population of about 200,000, and every other house has its cesspit. These are of varying capacities, from 10,000 to 50,000 gallons; they are built of rubble-stone and faced with hydraulic-cement. Leaching into the wells, it is asserted, is not of frequent occurrence, such impurities as the well-water contains being attributed to the growth of vegetation on the walls of the wells, which is allowed to accumulate and decay through want of periodical cleansings. These cesspits are sealed by a heavy round stone slab, accurately fitting into a cut-stone seat. The slabs are large enough to allow of the passage of a man's body through the hole they cover. They are fixed either in the court-yard (where there is one) or off the entrance to the house on the basement. Some 25 years ago these cesspits were emptied by hand. The farmers or laborers coming in at night and filling casks with the night-soil, carried it away in their carts to their farms. This primitive way was productive of considerable inconvenience and annoyance to the inhabitants of the houses, but as it did not occur oftener than once in 6 or 12 months, it was not considered a very serious infliction; and as a set-off to the nuisance was the circumstance that the owner's night-soil went to his tenant's farm, and increased the yield of the land, of which he was to receive half the crops.

After the union of Italy, and when Florence took the lead of Italian cities in becoming capital, the municipality adopted a system, which is still in vogue, yielding excellent results. A storage-farm was bought about two miles out of town, and receiving-tanks were built of capacity sufficient to hold twice the estimated average daily yield of night-soil for the town. Carts were constructed to carry iron barrels of the capacity of 500 gallons each, fitted with airtight holes and junctions for 2½-inch pipes. A glass gauge is fixed in front of each barrel, showing to what height the contents have reached. A combined suction and force-pump, resembling somewhat an antiquated hand fire-engine, is used, worked by four men. This is transported from place to place by horses. A disinfectant is burned in a closed retort attached to the pumps, and the fumes are allowed to permeate the machine and escape in small quantities into the air, neutralizing all gases which might accidentally leak through the joints. To each cesspit a pipe is fixed, reaching from the basement floor to the bottom of it, about 3 inches in diameter, and which is a fixture; on the top of this, level with the floor, is fixed a screw-cap of brass, hermetically sealing it. When the pit is to be emptied a suction-pipe of rubber, stiffened with coiled wire, is coupled on between the cesspit and the intake on the pump, and between the pump and the traveling-barrel.

The pumping goes on and the barrels are filled successively, without the slightest offense to the natives. The process is going on every day of the week in half a dozen quarters of the city.

The barrels are taken off to the storage-farm, and emptied through the manhole into the tanks, then cleansed, deodorized, and rendered fit for immediate use.

The farmers repair to the storage-farm and fetch the night-soil in the old-fashioned style of farm-carts and hand-barrels. These are emptied into smaller tanks attached to each farm-yard, and there it is mixed with the liquid from the cow-sheds and piggeries, and a certain small proportion of water, worked up by hand, so as to thoroughly mix the solid portions with the liquid, and eventually it is ladled out into the irrigation-furrows which distribute it on the land. An hour after it is thus distributed every trace of smell has disappeared, and the night-soil liquid-manure is perfectly deodorized. No other manure is in use in Tuscany, and the market-gardens, vineyards, and grass-lands have been yielding in undiminished fashion for centuries."

We apprehend that Americans, with their sensitiveness to foul smells, would be unwilling to consider the prosperity of market-gardens sufficient compensation to justify the toleration of a "storage-farm" for filth, or such methods of removal, to say nothing of the risks of constant well-water contamination.

WASTE REMOVAL AND ARTIFICIAL MANURE AT NATAL.

A CORRESPONDENT sends us the following article on "Artificial Manure Manufacture in Natal." The excessively high cost of imported fertilizers no doubt encourages the attempts of local manufacturers:

At the exhibition held in D'Urban at the end of last year, samples of this colonial made artificial manure was exhibited and highly approved of.

About four miles to the northeast of D'Urban, along the coast and quite close to the station of Umgeni, lies a farm belonging to Mr. D. Brown, who is an old colonist farmer and planter. He has for years held the contract for the removal of night-soil and garbage from D'Urban, a flourishing sea-port of 15,000 inhabitants, and has continually used this since the contract has been in his hands for reclaiming waste-land and regenerating impoverished land on his estate, and with the best and most encouraging results. The night-soil and garbage are removed in carts at night by laborers in his employ, and are collected in barrels, the separate-pan system in detached outhouses being in vogue at D'Urban. The plan adopted for removing night-soil and garbage, and converting it into a commodity capable of transit without inconvenience by rail or road, is as follows: At the natural slope of the hill close to the homestead there are several cemented floors laid out in squares of about 50 feet, with a low wall around them. The soil, on its arrival at the estate, is placed on these floors and allowed to dry for three days. The garbage is then sorted, the solid portions, such as bones, broken wood, etc., are placed on one side for carbonization when added to a due proportion of fresh wood in charcoal heaps. The rest, which is capable of quick decomposition, is placed on the dunghills and eventually used with the products of the stable, and on Krall (inclosure) for top dressing. To prevent disagreeable effluvia, and to preserve the valuable volatile element which should be present in good manure, the soil is raked over as soon as laid down, and is then covered with charcoal made from both animal and vegetable substances sorted out of the garbage and carbonized, which acts as an absorbent and deodorizer. The soil is then treated with a mixture of whiting and sulphuric-acid, to fix the ammonia and sulphate of iron and volatile carbons. At the end of the three days during which this manipulated soil remains on the floors, it contains all the most valuable phosphates required in the best artificial manure. Though roughly dried, the whole of the treated soil is passed through a centrifugal disintegrator to thoroughly separate the component parts; thence through an oscillating sieve to remove unnecessary substances (*e. g.*, paper), and lastly is placed in sacks ready for transport and sale. When it has passed through all these processes the quondam night-soil has ceased to be offensive either to sight or smell.

The amount of night-soil received at the farm daily is six tons, from which, by the present system of manufacture, one ton of artificial manure is produced. In the process of manufacture twenty-six coolies are employed. As compared with imported manure the locally manufactured article is inexpensive, costing £2 5s. a ton as against £15 to £18.

AN ENGLISH BURYING-GROUND AS A BUILDING SITE OR REAL-ESTATE SPECULATION.

AN extraordinary state of things was revealed the other day at the Worship Street Police-Court in London. The Metropolitan Board of Works sought to restrain a man, the freeholder of the ground, from building over a disused cemetery. The previous proprietor, some time prior to 1844, had laid it out as a burial-ground as a speculation. Although unconsecrated, the venture was so successful that by 1855, when the board restrained him under the Open Spaces Act, some 20,000 bodies are said to have been interred, the coffins of adults being packed side by side, and eight deep, while in the graves of children they were twelve deep. The then freeholder, desiring to make another honest penny out of his property, removed all tombstones, leveled the ground, razed the chapel, and shot rubbish over the ground to give it the appearance of waste ground for sale for building. Owing to the antagonistic action of the Board of Works he was unsuccessful. At his death in 1883 the present proprietor actually started building, hence the present action. The defendant claimed having complied with the instructions of the Board Surveyor in that he removed all objectionable matter between the surface and the bottom level of his foundations, such matter not being either coffins or dead bodies. He contended that the only way the board could restrain him was by buying the land. The magistrate, Mr. Hannay, held that no such contingency as the present had been contemplated in the board's by-laws, but that the objectionable matter contemplated was vegetable refuse, dead cats and dogs, etc. He pointed out that the defendant would have offended common law had he removed any bodies, and that his contention for compensation was justified by the law. The case is to be appealed, and the final result is awaited with interest. The relatives of persons buried seem to have taken no action in the matter, probably because the neighborhood is a poor one.

WHEN the question of reform in the Egyptian sanitary system was raised at the Egyptian conference by the German ambassador, the conference, under leadership of Earl Granville, British Foreign Secretary, refused to consider it, declaring it to be a matter outside of the sphere of the conference.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XII.

(Continued from page 220.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

EAST QUADRANT—SANITARY CLOTHING REFORM.

THE influence of dress upon health is a phase of sanitary science as yet but vaguely understood. It has rarely been dealt with as a whole, reformers limiting their efforts to the overthrow of one special abuse. Some attack the unnatural shape of the modern fashionable boot; others denounce the evil effects of tight lacing, the poisonous consequences of certain dyes, or proclaim the virtues of the divided skirt. All these and many other points are fully illustrated by the exhibits in the space devoted to clothing in the East and West Quadrants. There is, however, one exhibit in which something more than an attack on certain details is attempted; we refer to that of the Dr. Jaeger's Sanitary Woolen Company, 42 and 43 Fore Street, E. C., where the entire system of clothing introduced by Dr. Jaeger is exhibited.

Dr. Gustav Jaeger, who is professor of zoology and physiology at the Royal Polytechnic School, Stuttgart, and the Royal Agricultural College, Hohenheim, has for many years conducted scientific experiments on the question of clothing. These investigations have led him to the conclusion that it is absolutely wrong to clothe animal bodies with vegetable substances. Not only are cotton, linen, and other vegetable tissues rapid conductors of heat and cold, but absorb, without being able to eliminate, the noxious emanations of the human body. Dr. Jaeger proposes, therefore, to replace vegetable by woolen tissues, as being the most available animal substance. As a rule, the wool is not woven into flannel, but into what is called "stockingette," which gives greater facility for the passage of air, and, being more elastic, fits more closely to the body. It is not, however, simply the clothing which comes in contact with the skin which should be of wool; woolen clothing must be adopted throughout. Linen or cotton shirts, or even cotton lining or padding in the outer garments, lessen the benefit to be derived from woolen underclothing. The coat must be of pure wool, and if lined at all must be lined with woolen material.

White cashmere collars and cuffs can be affixed to the undergarment or shirt of pure undyed wool. Both coat and shirt should be double-breasted over the middle line of the chest and stomach. The blood-vessels of the trunk of the body converge in this region. Their expansion is secured by extra heat, thus sending a more abundant supply of blood over the entire trunk of the body. By the perfect ventilation over the entire surface of the skin, and the improved circulation of the blood in the small vessels under the cuticle, the body is able to throw off its superfluous water and fat. Thus corpulence is cured or prevented, and the body hardened. Dr. Jaeger claims that this hardening of the body, resulting from the unimpeded exhalations of the entire skin surface, renders one less susceptible to all forms of disease, whether infectious or otherwise, and tends, therefore, to prolong health and life. Further, since wool is a non-conductor, the wearer is not exposed to the danger of "catching cold," for a change of temperature only makes itself felt gradually. To render this more certain, there is within the lower part of the leg of the trousers and in the sleeves of the coat a woolen lining that is fastened tight around the wrist and the ankle, so as to prevent a sudden up-draught of cold air. The boots are made of porous leather and felt, the stockings of wool, with divisions for the toes. The hat also should be of wool.

Dr. Jaeger claims that practical experience has proved that the action of wool, when unimpeded by the presence of any vegetable fibre, is to throw off the noxious emanations of the human body, so that the unpleasantness noticed in ordinary clothes will not exist. The sense of smell, no longer blunted by constantly carrying about our own persons unpleasant odors, is consequently greatly developed, which is another proof that a purer condition of life has been attained. But, of course, the rules applying to the clothes worn during the day must also be observed at night. A night-dress, double-breasted, and of undyed woolen stockingette, a woolen rug, and a woolen mattress should be used, though white cashmere sheets and camel's-hair rugs are also allowed, but linen and cotton sheets are irrevocably condemned. On the other hand, sleepers in the wool having

nothing to fear from change of temperature, from damp or cold, are ordered to keep their windows open, summer and winter, so as to benefit, especially at night, from the breathing of pure air.

The exhibit of various articles of clothing for day and night, for male and female, show that the system has been fully developed, and it is said to have been adopted in its entirety by a large number of his own countrymen, by many Russians, by a few Englishmen, and by sanitary reformers. Perhaps, however, the most interesting fact is that the system has been adopted by General Von Moltke and General Manteufel, and that its principles may influence the selection of uniforms for the German army.

We will not enter further into the various theories underlying the system; some of them would hardly be accepted even by those adopting the system of clothing. One point, however, may be mentioned, and that is that the question of the absolute weight of a person, male or female, is of less importance than the specific weight, and the Doctor suggests that it would be well to have an apparatus constructed by which it would be possible to ascertain not merely the weight of an individual, but also the space actually occupied by the body, and thus determine the weight for a given bulk. He has found as much as 40 per cent. difference in the specific weight of different individuals, and claims that by the use of his system of clothing, the specific gravity of the body is increased, and the body thus made more compact, or hardened, as he expresses it.

EASTERN CENTRAL GALLERY B—MATERIALS FOR SANITARY WORK.

Hitchings Fireproof Plastering Co., 1 Gresham Buildings, Basingham Street, London (stand No. 808), shows a model of a building partly fitted with its specialty, the novelty being that the plaster, already prepared on blocks, is screwed on the joists for the ceiling, instead of being applied to the laths in the usual way.

Wilkes Eureka Concrete Co., Devonshire Square, London (stand No. 815); Arch. Dawney, King William Street, London, E. C. (stand No. 809); Francis & Co., Vauxhall, London (stand No. 831); William White, Westminster Chambers, Victoria Street, London (stand No. 830); H. Robertson, Caversham, Oxon, Eng. (stand No. 829); Malcolm Macleod, Deansgate, Manchester, Eng. (stand No. 811), are exhibitors of various cements and concretes in this Gallery.

The Val de Travers Asphalt Co., 14-16 Palmerston Buildings, London, E. C. (stand No. 812), exhibits asphalt for sanitary purposes, etc. In the exhibit is a model of a stable stall, with grooved concrete floor for drainage.

Steele & Wood, of Stoke-on-Trent, and Dashwood House, London, Eng. (stand No. 813), have an attractive exhibit of tiles, plain and ornamental, some of the painted ornamental tiles being very well done.

The Hartshill Brick and Tile Co. (J. & J. Birks), Stoke-on-Trent, Eng. (stand No. 816), exhibits an assortment of floor and roof tiles, finials, and ornamental terra-cotta work for buildings.

H. Dudley Cooper, 33 Wimpole Street, London (stand No. 464), exhibits glass-lined iron piping, the same as formerly offered for sale by the late Mr. Radde, of New York.

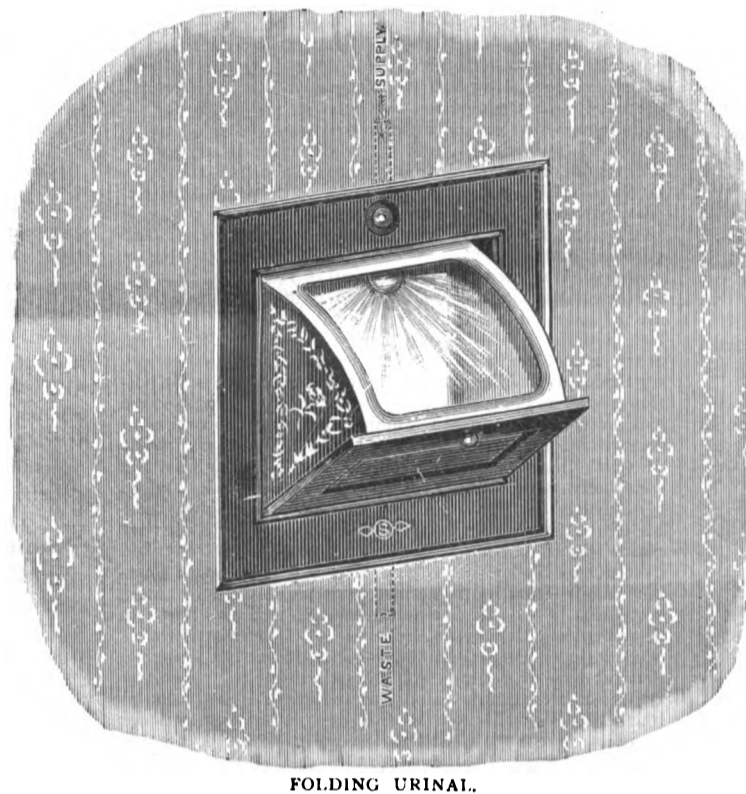
Diespeker & Co., 40 Holborn Viaduct, London (stand No. 803), exhibit specimens of mosaic-work, used for the floors of bath-rooms, lavatories, etc.

Chedgely & Co., Great Guilford Street (stand No. 457), have an exhibit of glass-bored cylinders of various bores to be used for pump chambers and kindred purposes; likewise of glass-lined iron piping.

The Crystal Porcelain Pottery Co., 17 St. Bride Street, London, E. C. (stand No. 799), has a room showing a great variety of tiles of their manufacture for walls and floors.

Charles Drake & Co., of Battersea Park, London (stand No. 804), exhibit various forms of concrete for building apparatus, included in which is a bath-tub made of concrete with a polished interior surface.

Ingham & Son, 35 Bucklersbury, London, stand 840, exhibit gullies and earthenware trap, with inspection-holes for main drains. They also show their rest-pipe, which



FOLDING URINAL.

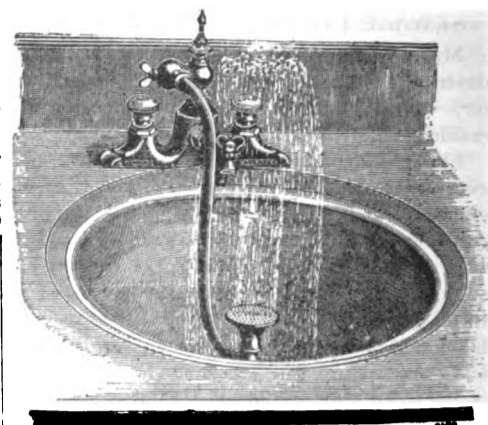
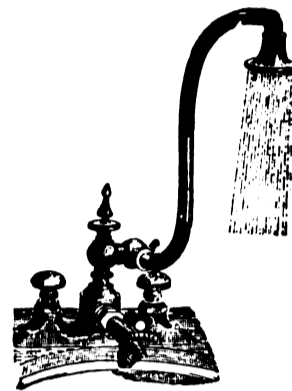


Fig. 3.
SPRAY LAVATORY.



COCK AND SPRAY.

consists of a projection on the inside of the bottom of the socket for the spigot end of the next pipe to rest upon, so as to insure the inside being perfectly true on the bottom, and so avoid any projection which would be likely to obstruct the free flow of sewage.

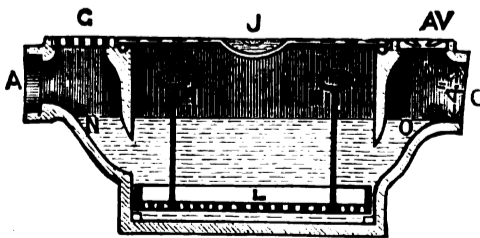
George Jennings, Stangate, Lambeth, London (stand No. 66), exhibits quite a variety of terra-cotta trimmings for buildings, the specimen of lead-work which has been elsewhere described, and a very elegantly fitted-up spray bath and lavatory in walnut, the walls of the room containing the latter being attractively decorated. In connection with the lavatory there is a combination shower and spray shampooer and basin-cock.

The tube shown on the basin as a spray may be swung to different positions, so that it may serve as a shampoo sprinkler, a spray, or when not required be moved so as to be out of the way. A double joint renders these various movements quite easy.

There is also a folding and inclosed urinal. A lip-urinal is placed on a marble slab inclosed in a half-round mahogany casing. In lifting the top the double doors open, and at the same time a spring-valve is opened which permits the flow of water into the urinal. On lowering the lid the doors close and the flush ceases; the entire arrangement occupies a space of 20 inches on the wall and projects into the room only 18 inches. The same principle is applied to an angle urinal, occupying, with mahogany casing, 14 inches in the niche.

EASTERN ANNEX—PLUMBING APPARATUS.

Stand No. 530 is that of Dent & Hellyer, 21 Newcastle Street, Strand, London, where we notice a new form of earthenware slop-sink, made square, and with a large flange at the bottom to rest upon a bracket projecting from the wall, in order to relieve the lead trap of the entire weight of so heavy a piece of porcelain. It is recessed in the front, and bound with a piece of rubber with brass clasps, the recess being intended to facilitate the emptying of the pail. The arrangement of the strainer in the bottom is novel, since it has lugs which drop through openings over a groove around the out-go; by a slight turn of the strainer



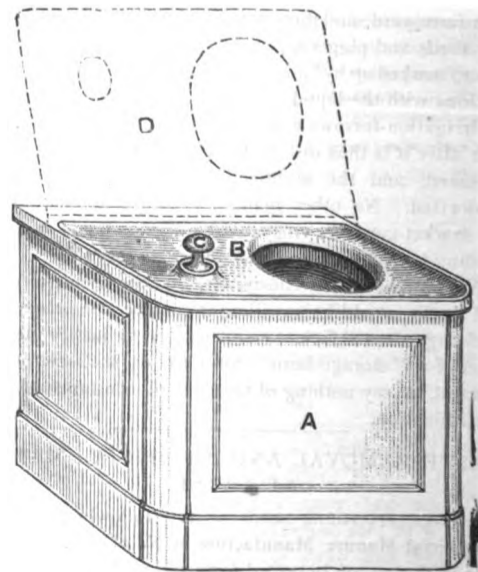
GREASE-TRAP.

the lugs engage with projections and the strainer is locked it can, however, be readily removed for cleansing purposes or removal of stoppages, etc.

The most attractive novelty in this exhibit is an earthenware inclosure for a water-closet. In the illustration it will be noticed the sides and front and top are of white glazed earthenware, in one side of which is glass set in a brass frame, and the other is a brass grating. The top (which serves also as a drip-tray) and each side are in separate pieces made true and neatly fitted.

Capper, Son & Co., Ingram Court, Fenchurch Street, London (stand No. 540), exhibit their Twin Basin, and several other water-closets, baths, and lavatories. An ordinary bibb-cock is shown, to the end of which a projecting filter is attached. When the filter is not intended to be used it can be lifted up, having a swivel-joint for the purpose, and the water then delivers direct from the trap. They also exhibit folding wash-basins, such as are now used on the recently built transatlantic steamers—as, for instance, on the *Aurania*.

Thomas Walier & Co., 43 Fish Street Hill, and the Grove, Southwark, London (stand No. 521), exhibit a variety of water-closets, and a pair of urinals, fitted up in marbleized slate stalls, a feature of which was a projecting shelf, which covered a flue communicating with a stack of pipe heated to assist ventilation. This firm also exhibits baths in the East Central Gallery.



INCLOSED WATER-CLOSET.

Jennings & Co., Stangate, Lambeth, London (stand 522), exhibit their various water-closets and urinals. They are also referred to elsewhere in their exhibit in East Central Gallery.

Shanks & Co., Tubal Foundry, Barrhead, near Glasgow, Scotland, and Cannon Street, London, exhibit at stand 523 various kinds of water-closets, etc. Their baths and lavatories in East Central Gallery are already referred to.

George Farmiloe & Sons, 34 St. John Street, London (stand 542), exhibit an attractive assortment of plumbers' brass-work, included in which we recognize some of American manufacture, also Du Bois' drawn-lead traps and bends, the Ess water-closet, and a tilting waste-preventing cistern. In this a pull of the chain tilts a container inside of the cistern proper, and which holds the required amount of water. On releasing the chain the tilting basin returns to its normal position. The ball-cock and valve are within the inner basin.

Lawson & Donkin, Trinity Chambers, Bournemouth, Eng. (stand No. 545), and John Parker, Woodstock, Oxon (stand No. 544), exhibit various forms of earth-closets.

G. T. Blundell & Co., West India Road, London (stand No. 547), exhibit several forms of ships' closets and pumps.

Henry Overbury, High Street, Alcester (stand No. 565), exhibits various sized cakes, composed of sulphur and shavings, for disinfecting purposes, the shavings being intended to facilitate the burning.

Henry Owen & Co., 82 High Street, Kensington, London (stand No. 532), exhibit their various forms of water-closets, grease-traps, etc.

Stand No. 535 is the exhibit of Moule's Patent Earth-Closet Co., limited, 5a Garrick Street, London, in which the various forms and adaptations of earth-closets are shown. A very neatly gotten up model illustrates a group of earth-closets for use in schools, etc., with a miniature tank, such as is used at Broadmoor Convict Prison, for removing the faecal matter collected in the receptacles.

The Domestic Engineering and Sanitary Appliances Co., 24 High Holborn, London (stand No. 566), exhibits some so-called rustless steel-enameled slop-sinks, which seem to be punched out of a piece of metal and enameled afterward.

The London Patent Automatic Disinfectant Co., Queen Victoria Street, London (stand No. 526), shows an appliance for injecting a disinfectant fluid into a filthy water-closet to destroy the offensive odors. If closets were properly put up, flushed, and maintained, there would be no occasion for the use of such devices.

Wilcox & Co., Burmantofts, Leeds, Eng. (stand No. 528), exhibit a stall of closets for railway stations, schools, etc., set with glazed-brick sides and partitions. The closets are on the trough principle, and have a flush-tank arranged over one end of the stall to discharge at intervals.

Thomas and William Farmiloe, Rochester Row, London (stand No. 531), have a tastefully-arranged exhibit of plumbers' material and brass-work. They also show a waste-preventing cistern, in which a copper float starts the syphon by being depressed in pulling a chain, and so displacing sufficient water for that purpose.

(TO BE CONTINUED.)

THE RIGHT TO THE STREETS.

SOME time since the Philadelphia Steam-Supply Company entered application in the courts for an injunction to prevent the city authorities from interfering with the laying of its conduits in the streets of the city, and also for a mandamus to compel the Chief Commissioner of Highways to issue to the company a permit to open the streets to lay its pipes.

The case was based upon the rights the company claimed from its charter, which it argued gave it the authority to lay its pipes in the city without the permission of the Highway Department and without interference of the police. An attempt was made to open the streets without a permit, but this was stopped by the police, hence the suit. Judge Fell, in his decision, reviewed the facts and claims of the company, and says: "The company claims the right to lay its pipes without the city's consent; the city claims that the company can do nothing until such consent has been expressly given. Neither of these extreme positions can be sustained. The statute gives, in express words, 'the right to enter upon any public street, lane, alley, or highway, for the purpose of laying down pipes, altering, inspecting, and repairing the same.' This right the city cannot take away by express prohibition, nor *a fortiori* can it do so by mere inaction; but, on the other hand, though the powers given by the statute are large (if we may

express our personal conviction, unfortunately and dangerously large to be committed to any five persons who may choose to come together and assume them as a corporation), yet they are not without limitation. The same section of the act expressly subjects the company to the restriction of 'doing as little damage to said streets, lanes, alleys, and highways, and impairing the free use thereof as little as possible, and subject to such regulations as the councils of such borough, town, or city may adopt in regard to grades, or for the protection and convenience of public travel over the same.'" And independently of this language the law would imply the same of such a grant to the general police powers of the municipality.

He decides, therefore, that the company has the right to lay its pipes in the city's streets, subject to the regulations of councils, and reviews the laws prohibiting the company from opening the streets without permission of the Highway Department, and sums up as follows:

"On the whole case, therefore, we are of opinion,

"First—That the company, complainants, has the right to lay its pipes as specified in its charter, subject to all reasonable regulations, present and future, by the city.

"Second—That the complainants' application for a permit should be received by the Chief Commissioner of Highways, the respondent, and submitted by him to the Board of Highway Supervisors, and a peremptory mandamus will be awarded, if necessary, to enforce such action on his part.

"Third—That thereupon it will be the duty of the Board of Highway Supervisors to consider and determine upon such application.

"Fourth—That until the Board of Highway Supervisors shall have approved the complainants' application the Mayor and police are not exceeding their proper authority in preventing the opening of the streets, and the injunction prayed must, for the present, be refused."

Before resource was taken to the courts application was asked of councils for permission to lay its conduits in the streets of Philadelphia, but that body refused the request. This refusal was based on the explosions in the New York Steam-Supply Company's mains, which occurred about this time, and councils seemed desirous of preserving the city from like occurrences. Suit was therefore brought to restrain the police from interfering and compel the Highway Department to grant the necessary permit.

At the meeting of the Board of Highway Supervisors on June 25, the counsel for the company, John R. Read, made application for a permit to lay the conduits on Market, Arch, and Race Streets, from Fourth to Ninth Streets, and on Fourth, Fifth, Sixth, Seventh, Eighth, and Ninth Streets from Race to Market Street.

The opinion was expressed that the Board of Supervisors could not grant permission after it had once been refused by city councils, and this question was referred to the City Solicitor for an opinion, and ordered the company to submit to the board plans of the work proposed.

It is rumored that the company will be asked to give security in \$50,000 to cover any damages done by explosions or other injury to life or property.

QUALITY IN CANNED GOODS.

THESE are timely words from the *American Grocer*, now when England is excited over alleged cases of poisoning from American canned products:

"Opening a can containing peaches preserved in three degrees of syrup, the label on which stated they were packed where grown, brought to mind the assertion of one of the oldest and most experienced men in the canned-goods trade, that, had a better quality of goods been packed, the consumption would be ten times what it is at present.

"The remark is true, so far as the principle involved is concerned. Cheap canned peaches are an illustration of how poor goods restrict consumption. Flavor, size, condition, quality of syrup, are ignored in their packing, and the result has been a dragging market for all canned peaches, except extra fruit bearing favorite labels. Consumers have found there is no comparison between evaporated peaches and common canned peaches. The former are economical and of luscious flavor, and every one who tries them for the first time becomes a permanent consumer. On the other hand, one can of peach-slops or trash disgusts people, and causes them to avoid, more or less, all varieties of canned goods. Why preserve in tin peaches, the flavor of which departs when canned? A can of extra peaches was recently opened, the flavor of which was so near that of a high-flavored fresh peach that a company of experts were astonished, and unanimously agreed that they had never before found the flavor so perfectly preserved. That sort of fruit in tin increases trade, regardless of price.

"We this week opened a can of what purported to be blackberries. It was some sort of berry-mush, the very sight of which would nauseate the average consumer. Corn, that has no more flavor than basswood shavings, refuse tomatoes, stale peas, spoiled meats, poultry, etc., are placed in tins, the packers stubbornly blind to the fact they are working their own destruction. The trade is exercised as it never has been before about this matter, and it ought to be exercised. It costs about as much for tins, labels, boxes, and labor for the canning of trash as for the finest quality of food. Freights are as great on one as the other. The poor goods repel, the better win, trade. One sort disgusts, the other pleases, consumers. We purpose to do all we can to stop the packing and sale of canned goods, the quality of which will check consumption. It is our purpose to examine and report upon all canned goods sent to this office for inspection. Our decision will be based upon a classification of quality established by a standard used by first-class firms in making purchases. This standard, when completed, we shall keep standing in our columns, to be used as a basis for reports and for the guidance of our subscribers.

STANDARDS OF LIGHT.

AT the meeting of the Gas Institute in 1883, the President, Mr. R. O. Paterson, suggested that the question of standards of light be referred to the council, with power to take such action in the direction of an investigation as might be deemed best. A committee was appointed by the council to investigate the question, and its report, which was presented at the meeting of the Institute in June last, is as follows:

To the Council of the Gas Institute:

GENTLEMEN: Your committee met and discussed the question remitted to them, and determined that a standard of light should be such as would at all times and under all circumstances be of equal value, and give out the same amount of light, and that it should be easily reproduced.

They resolved that, as any standard having a wick as one of its component parts cannot be relied upon to give unvarying results, the sperm candle only (being the present standard in this country) should be tested as representing this class, and that the other suggested standards to be tested should be:

- The Methven Screen,
- "Harcourt Air-Gas,
- "Harcourt Air-Gas Lamp.
- "Giroud *Vérificateur*, and
- "Giroud Relative Standard.

They therefore resolved that an exhaustive series of experiments should be made with candles which complied with the parliamentary definition, with a view to find out the amount of variation in the results obtained from those of different makers, and of conclusively determining the amount of reliability that could be placed on the best of them.

They further resolved that, while members of the committee promised, as far as possible, to institute independent investigations, it was necessary to engage the services of an expert. A sub-committee was therefore appointed, with instructions to make the necessary arrangements, and to engage the services of Mr. Charles Heisch.

Mr. Heisch having accepted the invitation of the committee to undertake the work, requested that Mr. F. W. Hartley be associated with him; and to this the committee cordially agreed.

By the kindness and courtesy of the Gas-Light & Coke Company, a gas-holder, charged with gas, with photometer-room and apparatus, at the Horseferry Road station of the company, were placed at the disposal of the committee. It was expected that the stored gas would remain of uniform quality throughout the experiments. It was, however, found that such was not the case. But this variation did not, in the opinion of the committee, detract from the value of the experiments, and it facilitated the determination of some points in the investigation.

With this you have a copy of the very elaborate report of Messrs. Heisch and Hartley—a report which bears evidence of care and thoroughness, and which shows, as was to be expected of these gentlemen, that their work was undertaken and carried through *con amore*.

The deductions to be drawn from the report are:

That candles of different makers, all complying with the parliamentary definition, give very discordant results.

That candles from the same maker vary in the results they give, though to a less extent; and that therefore the candle is not reliable as a standard.

* The report will be published as an Appendix to the present year's "Transactions of the Institute."

That the Harcourt standards are not convenient, or suited for use in general photometry, as they demand too much attention from the operator.

That the Giroud standards "are not exact enough to be adopted as absolute standards."

That the amount of light passing through the slot of a Methven screen from an Argand burner in which gas varying from 14 to 22 candles illuminating-power is consumed, and from gas of any quality when carbureted in a defined manner, is practically invariable, and may therefore be relied upon at all times, and under all circumstances be of equal value and give out the same amount of light.

The committee congratulate the council that this investigation has demonstrated the important fact that there is, at least, one instrument which may be trusted to give a practically uniform amount of light, and they are much pleased that it is, at the same time, the simplest in construction, the most easily manipulated, the most readily brought into requisition, as well as the cheapest and most durable of all those brought under its consideration.

If it be thought objectionable to use coal-gas as a means of producing the standard light, Harcourt's air-gas, or even air carbureted with highly-rectified petroleum, may be used, as we have ascertained that they both give reliable results with properly proportioned Methven slots.

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

No. XXII.

(Continued from page 170.)

LINING SINKS.

SINKS of all kinds are made in such quantities and of such a variety of materials that one would think the plumber would never be called upon to make one. Some of these sinks are made of galvanized wrought-iron, but these are not much liked, as dirt accumulates around the rivet-heads, and so they are difficult to keep clean. Enamelled-iron ones are very good until the enamel gets chipped, but they are unfit for wash-up purposes, as, being very hard, they are destructive to crockeryware and any other frail articles that may be cleansed in them. Vitrified stoneware and potteryware sinks are easily kept clean, but are very liable to get chipped, or perhaps broken, and are quite as ruinous to glass or chinaware as the other kinds of sinks described. These sinks are also very difficult to get true in shape, as they warp and twist very much in drying and burning. The sinks above described can only be had in what is called stock sizes, and if any other is wanted the buyer has to pay for the molds and patterns, and also has to wait for several weeks until they are made, and the manufacturer generally makes two, although only one may be ordered, as there is always a probability of one of them being unfit for use, and in which case, if that precaution was not taken, an interval of several more weeks would elapse before another one could be made, and attended with the same risks as for the first. Wooden sinks soon wear out, although they are the least destructive as wash-up sinks. Sinks made of slate slabs break by expansion when hot water is used in them. After looking all around the plumber need not have any fear of these rivals, for it is almost impossible to have anything better than a good lead-lined wooden sink. Any plumber can make them, and to any size and shape; they are not destructive to what may be washed in them, can be made at once and easily repaired when required, or the lead cut out and new put in when the old is past repair. The old material is a valuable set-off against the cost of the new. The only disadvantage they labor under is that hot water soon causes the lead to rise in buckles and eventually to crack and break, but this can be avoided a great deal by taking precautions which will be described. Sinks as a rule are lined in the same manner as cisterns, and generally about the same substance of lead is used. This is mistake number one, and is a false economy. If any one would take the trouble to calculate the quantity of lead required for a sink they would see at once that a few shillings or a dollar more would

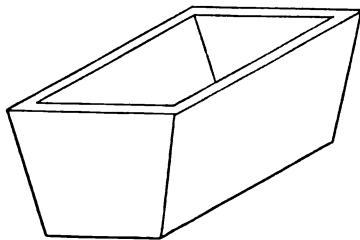


FIG. 1.

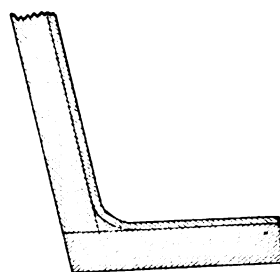


FIG. 2.

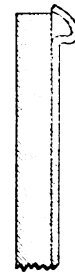


FIG. 3.

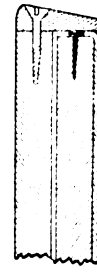


FIG. 4.

be in some cases sufficient to perhaps pay for lead double the substance, so that it would wear longer. As a rule it will be found that the ends and back side of the sink need not be quite so thick as the bottom and front side, but at the same time, as an economy, the four sides and bottom are made out of one piece of lead, so that the four corners only need be soldered, thus saving that material. This way of lining a sink was described in an earlier paper when speaking of cisterns. Another mistake often made is when the wooden case has its sides and ends at right angles to the bottom. When this is done the lead lining is so fixed that it cannot expand when filled with hot water, so that the bottom bulges upward, and eventually a ridge is formed. As this ridge stands up a little it gets worn very much, and gradually gets worse and worse, until it breaks. When this occurs it is generally soldered over, leaving an unsightly-looking patch, very few plumbers taking the trouble to pull up the lead and dish out the wood-work beneath, and then dress the lead into it so that it can be soldered flush with the surrounding parts. Sinks should always be repaired in this manner. It is advisable before dressing down the lead into the dishing to place two or three thicknesses of paper, so that when soldering the place the heat may not convert the water in the wood-work into steam, which would keep "blowing" through the solder. The plumber could also make a neater and quicker wipe, as the metal would not chill so quickly by the wet and cold beneath.

If sinks were made with sloping sides, as shown in illustration Fig. 1, the lead would not be held so tightly, and could expand and contract without such a risk of breaking, and would consequently last much longer. Of course it is very wrong to put a cistern where it is liable to be affected by frost; but if cisterns so exposed were made as described for the above sink, the expansion of the ice would not force out the sides and disjoint the dovetailed angles, as is so frequently the case. Another good plan when lining sinks is to have a hollowed wooden fillet fixed in each angle, as shown in section, Fig. 2. In addition to distributing the effects of expansion, it avoids any sharp angles in which dirt and grease can accumulate beyond the reach of the scrubbing-brush. A great many men are in the habit of not only turning the lead on the top edge, but also down the sides for about an inch or an inch and a half. This is a waste of lead, and it also leaves a dirty black mark on the dress of the person using the sink.

It is generally done on the front side, so as to prevent the lead being knocked and buckled over into the sink, as shown in section at Fig. 3, by standing pails, etc., upon the edge; but this can be avoided by putting an oak capping-piece and fixing it with brass screws, as shown in section, Fig. 4. This capping should be "weathered" inward, so that any water falling upon it will run into the sink. Where the sink is fixed in an inclosure the capping should extend to the front, so as to prevent any water falling down between, and also to hide the joint, which generally gets filled up with grease and other dirt. In hotels, clubs, and other large establishments, this capping can be made of galvanized-iron, but in private houses the oak looks cleaner and neater.

When soldering brass gratings into sinks the mistake is generally made of not having the dishing around the waste-hole made deep enough, so that tubs or pails may not bend or injure the grating. This remark also applies to gratings

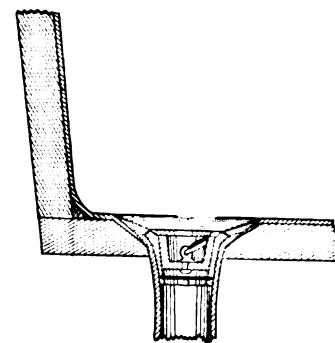


FIG. 5.

in stone sinks. It is not at all uncommon to see the grating stand higher than the bottom of the sink, so that to get rid of the water it has to be swept into the waste. It may have been all right when first fixed, perhaps, but the bottoms of these sinks generally get torn away by the iron hoops of tubs or pails, or when scouring copper cooking utensils.

When metallic or metal-lined sinks are required for washing-up purposes, it is necessary to have a plug over the waste-pipe instead of a grating, so as to retain the water in the sink. If these plugs, which are ground into what is commonly called the "washer," is not sunk below the level of the surface of the sink bottom, they often get jammed in by pails, tubs, or dishes, so that it is difficult to get them out. When this happens, the usual thing to do is to take hold of the chain and pull until it breaks, or, perhaps, the brass ring by which the chain is connected to the plug. This can be avoided by not only having the washer soldered to the waste low down, as stated, but in addition to have the plug itself hollowed so that the ring can drop down, as shown in section at Fig. 5. Another reason why the ground in plugs sometimes gets fixed in the washers, is because the *plug when cold* is put into its place when the *washer is hot*, so that it is expanded, and which on cooling contracts and grips the plug so tight that in some cases they have had to be unsoldered before they could be got apart. It is always advisable to have wire cross-bars in the washer below the plug, to prevent spoons falling down the pipes and getting lost, or other matters getting into the waste which would choke it up. Some plumbers have gratings instead of the bars, but they generally reduce the water-way, so that the sink takes a long time to empty, or small matters get into the holes and clog them up.

For sink-tubs for washing vegetables it is a very good plan to have a tinned-copper perforated strainer fixed in the angle to prevent anything getting into the waste-pipe or plug-washer; this also prevents the plug from being jammed in.

It is important that all sinks with plug waste-pipes should have an *overflow*-pipe fixed, and this should be large enough to take away the water as fast as it runs in. Neglect of this precaution has sometimes resulted in serious damage to property, especially when the sink has been fixed in an upper story.

(TO BE CONTINUED.)

THE WATER-SUPPLY OF PARIS.

WE take the following statistics of the water-supply of Paris from the *Journal des Débats*. The author of the article from which we quote is of opinion that the quantity of the daily supply for domestic use is inadequate, while an excessive quantity is wasted in watering streets, and for other public purposes. In 1877 the total daily supply per

head was 185 litres (40 gallons); at present it is only 164 litres (36 gallons), and it will rise again to 180 litres (39 gallons) per head only after the completion of the new works now in course of erection, for a present population of 2,230,908 inhabitants. The following is the daily withdrawal of water from the existing sources of supply:

	Cubic metres.
Vanne.....	100,000
Dhuis.....	21,000
Arcueil.....	2,000
Ourcq.....	125,000
Seine.....	60,000
Marne.....	54,000
Artesian-well.....	7,000
	369,000
	(81,215,424 gallons.)

Of this quantity, at least 75 per cent. is used for public purposes, and only 25 per cent. is supplied to private houses, in the following proportions, approximately:

	Cubic metres.
For flushing sewers.....	139,000
For watering streets and squares.....	65,000
For the supply of private houses.....	95,000
“ “ public works.....	23,000
“ “ drinking-fountains.....	9,000
Waste.....	38,000
	369,000

From this statement it follows that the quantity used for public purposes is 120 litres (26 gallons), and for private consumption only 42 litres (2 gallons) per day per head. Moreover, it is stated that the best water is not exclusively supplied to the private consumer. At least 125,000 cubic metres (27,512,000 gallons) of excellent drinking-water, or 55 litres (12 gallons) per head, are supplied daily, but mostly used for public purposes, while the great majority of the inhabitants of Paris are furnished with the more or less polluted water of the Ourcq Canal, or through the pumping-station at Chaillot with Seine water.—*The Builder*.

Reviews of Books.

COMMERCIAL. No. 22. (1884.) Further reports respecting the cholera epidemic in Egypt, and the proceedings of the German Scientific Commission. Presented to both Houses of Parliament, etc. 46 pp. Folio. London, 1884.

This document contains the six reports of the German Scientific Commission, prepared by Dr. Koch, which have been already published widely, and the conclusions of which are well known. The last of these reports, dated at Calcutta, March 4, gives the result of an investigation into the water of a tank which had produced a small distinctly localized epidemic. The water of this tank was found to contain the peculiar comma-shaped micro-organism which Dr. Koch considers to be the cholera bacillus, and this organism, while abundant during the outbreak, disappeared at its close.

Besides the reports of Dr. Koch, this document contains several letters, memorandums, and reports on the origin and progress of the cholera in Egypt, among which may be specified a report by the International Committee at Mansourah, taking the ground that there is an intimate connection between the cattle plague and the cholera, and tending to show that the cholera was not imported; a report by Dr. Kirker on the cause of the cholera outbreak at Chatby, near Alexandria—the value of which may be estimated from the fact that he attributes the epidemic to the weather and discountenances the germ theory; and a report of the Special Sanitary Commission at Alexandria. In connection with this report is given a sharp minute by Mr. Clifford Lloyd, calling attention to the fact that the condition of Alexandria is discreditable to those charged with its sanitary administration, that nearly four thousand pounds is annually paid by the Government for inspection purposes, that the presence of the filthy latrines, choked drains, impure water, etc., shows that the inspectors have failed in their first duties, “leaving an outbreak of disease to give the first notice to the Government that they are doing nothing but drawing their pay regularly.”

Surgeon-General W. G. Hunter furnishes a memorandum on the sanitary state of Alexandria, in connection with which is a map showing the sewerage system of Alexandria, which is very unsatisfactory, and may be consulted as an illustration of how such work should not be done.

Dr. W. J. Simpson, Medical Officer of Health, Aberdeen, contributes some notes on the cholera at Damietta,

stating that “if ever a state of filth, in its general sense of pollution of soil, water, air, and food, produced cholera, Damietta possessed the wherewithal in a high degree.” He does not, however, favor the theory of spontaneous generation of the disease, and suggests the possibility that it may have been imported by some returning pilgrim from El Hedjas, about December, 1882. The last document which we will notice is an extract from the minutes of the Maritime and Quarantine Sanitary Board at Alexandria, at a meeting held December 4, 1883, and which is as follows:

“The Secretary read a letter from the Public Health Board, of the 20th of November, from which it appeared that the last cases of cholera in Upper Egypt occurred in the Province of Assiout, at Rounaly, on the 12th of October, and at Esuch on the 15th.

“The chairman then said that on the authority of the Public Health Board, he proposed to alter the endorsement on bills of health to the following:

“According to official information no death from cholera has been noted in the interior since the 15th of October last.

“At Alexandria no death from cholera has been noted since the 1st of December.”

“Dr. De Castro inquired whether the recently appointed sanitary committee went on noting the deaths from cholera which occurred in Alexandria.

“Dr. Freda Bey replied that all cases reported to the Sanitary Inspectors were looked into by one or two members of the committee.

“Dr. Klodzianowski protested against any alteration in the endorsement, as the statement made by the Public Health Board was founded on information which was not reliable.

“Dr. De Castro stated that that very morning a cholera patient had been taken to the Greek Hospital; he therefore proposed to amend the chairman’s proposal as follows:

“Cholera has ceased to exist in Egypt since the 15th of October last, except at Alexandria, where a few cases still occur.”

“The chairman’s proposal having priority was then put to the vote, and carried by 11 to 4. The board thus decided that the endorsement on bills of health and sanitary certificates should, for the future, be that proposed by the chairman.”

It will be seen from this that the condition of Alexandria, as regards the presence of cholera, is a matter of some uncertainty, and that the certificates of the Health Board, that there is no cholera in Egypt, are by no means to be received with implicit faith.

THIRD ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF NEW YORK. 379 pp. 8vo. Albany, 1883.

In the general report at the beginning of this volume it is stated that the health of the people throughout the year has gained “by the unusual and almost universal prosperity of their industrial pursuits, the abundance of the best fruit products and the increase of domestic improvements.” The mean population of the State during the year is estimated at about 5,200,000, and it is stated that there is ample evidence that the total number of deaths is not less than 100,000 yearly. This is considered to be largely due to the city of New York, which loses about 38,000 annually by death, and now has a death-rate of 30 and upward per 1,000. The board considers that the actual death-rate for the State does not exceed 21 per 1,000. With regard to the special causes of death it is remarked that in the cities of New York and Brooklyn, in 1881, about six per cent. of the total mortality was due to diphtheria, and that in some smaller communities this cause of death has been equal to 25, and in some cases 40 per cent. of the total by all causes.

“Its prevalence is generally more widespread in the State than any other disease which requires quarantining and disinfection. The board has done much to call the attention of local boards to the best means of restricting the spread of these two diseases, and more especially with regard to the duty of completely isolating those affected with them, and thoroughly disinfecting all known sources of contagion.”

During the year, small-pox was reported to the board at sixty localities and in upward of 150 different houses, and it appears, in all cases, to have been promptly brought under control by isolation of the sick and systematic vaccination. The brief accounts given of the mode of origin and spread of this disease in different localities are very interesting and indicate a very praiseworthy activity on the part of the board in tracing the course of the contagion.

One of the most striking of these is the discovery of a case of small-pox in one of the saloon cars on the New York, Lake Erie & Western R.R. on the 9th of November. The affected car and passengers were at once withdrawn from the train.

A lady, upward of ninety years of age, in the stampede from the affected car at Hornellsville, had hastily packed up her personal wraps and alighted from the train at Elmira. About an hour after the transfer, on the evening of the same day, she arrived at the house of one of her sons, in the town of Hector, Schuyler County. The result of this was, the son was attacked with hemorrhagic small-pox and died on the fourth day. The occurrence of true typhus fevers among Italian laborers on the West Shore Railroad, north of West Point, was verified, and the shanty lodgings of some six thousand laborers were inspected.

It is estimated that the proportion of deaths from pulmonary consumption is a little over 12 per cent. of the whole number of deaths in the State, and it is suggested that the limited amount of air-space and air-supply in the common schools of the State is one cause of the prevalence of this disease. The board has not been able to prepare any record of vital statistics, but states that it hopes to be able to submit a complete record of the deaths which occurred in the State in the year 1883.

The most interesting part of the report is that which relates to the complaints referred for investigation to the board by the Governor, with the detailed reports of engineers and experts of the results of their examinations, and especially to the results obtained by drainage in certain localities in mitigating the prevalence of malarial diseases. By the drainage of the swampy beds of certain abandoned canals in Chemung and Schuyler counties, the number of cases of malarial fevers occurring in the vicinity was so greatly reduced as to afford satisfactory evidence of the importance of the work.

The reports of Mr. E. Kuichling, C. E., upon these and other cases of obstructed drainage, and of Mr. J. J. R. Croes, C. E., on the Nepperhan nuisances at Yonkers, are valuable contributions to the literature of sanitary engineering. The report of Dr. Alfred L. Carroll on the causes of the unusual prevalence of disease in Pleasantville, Westchester County, is also a good piece of work. The report of the Committee on Quarantine, presented by Dr. William M. Smith, the Health Officer of the Port of New York, gives a good idea of the character and amount of work done at the New York City Quarantine, and contains some timely and sensible remarks on the subject of the hygiene of transatlantic passenger steamers. The insufficient and unsuitable hospital accommodation provided on many of the steamships is pointed out, and the worthlessness of the so-called vaccinations performed by some ship’s surgeons is well shown. The report of the work of the board under the Food and Drugs Adulteration Act is very meagre, and it would seem that little interest was taken in this subject.

Those who are interested in school buildings will find the plans and description of a new school-house in the city of Auburn, given in the report of the Committee on Public Institutions, to be suggestive and worth examination.

About seventy-five pages at the end of the volume are occupied with what is called “The Permanent Series of Sanitary Documents, issued by the State Board of Health,” including copies of the Health Acts, Circulars of Instruction, etc., etc., the whole forming a convenient compend for the use of local boards and health officers.

Taken as a whole, this is the best report yet issued by this board, and one of the best recently issued by any State board, and we commend it to our readers as containing the records of some original investigations and work, and as being, therefore, a valuable work of reference.

UNTIL recently the large fruit-dealers of Philadelphia were in the habit of depositing the refuse of their stores on the public dumps in the southern part of the city. The health board has ordered this practice stopped, and the firms request information as to the disposition they shall hereafter make of it. It was suggested that this refuse be taken out to salt water and there dumped, but the subject was referred to the sanitary committee.

REPORTS from Panama represent that the yellow fever is increasing daily.

OWNERS of two hundred and seventy-two pigs have been prosecuted by the Brooklyn Board of Health. The Health Commissioner has decided not to allow any piggeries to remain within the city limits.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING AUGUST 2, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.							Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.	
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.								
NORTH ATLANTIC CITIES.																											
Portland, Maine.	35,000	20	29.7	11	55.0	1	—	4	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Boston, Mass.	435,000	245	29.8	130	53.0	5	1	23	2	78	1	—	—	—	4	3	—	3	—	—	—	1	1	—	—	12	
Lowell, Mass.	71,500	39	28.4	21	53.8	1	—	6	—	14	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	
Worcester, Mass.	69,000	23	17.3	12	52.1	1	—	3	—	7	1	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	
Fall River, Mass.	67,000	38	29.5	26	68.4	—	—	—	—	17	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
New Haven, Conn.	69,500	33	21.7	18	54.5	—	—	—	—	14	—	1	1	—	2	—	—	—	—	—	—	—	—	—	—	—	
Providence, R. I.	125,000	48	20.0	26	54.1	4	—	2	—	16	1	—	—	—	1	1	—	1	—	—	—	—	—	—	—	—	
Total	872,000	446	26.6	244	54.7	12	3	38	2	152	3	1	2	—	8	6	—	7	—	—	1	2	—	—	—	14	
EASTERN CITIES.																											
Albany, New York.	103,000	46	23.2	17	36.9	2	—	6	—	11	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	2	
New York, New York.	1,355,000	726	27.0	380	52.3	32	3	102	5	182	13	2	6	4	7	34	—	15	—	—	18	—	—	—	—	19	
Brooklyn, New York.	670,000	308	23.9	195	63.3	6	—	24	2	129	3	—	—	—	6	10	—	6	—	—	3	5	—	—	—	10	
Hudson County, New Jersey.	225,000	101	23.8	51	50.4	5	—	12	—	19	1	—	—	—	7	—	—	—	—	—	—	—	—	—	—	—	
Newark, New Jersey.	154,000	84	28.4	43	51.1	1	—	10	2	17	1	—	—	—	2	3	—	1	—	—	—	—	—	—	—	—	
Philadelphia, Pa.	940,000	454	25.1	225	49.5	12	2	62	4	98	5	—	—	—	6	14	2	9	—	—	4	—	—	—	—	5	
Wilmington, Delaware.	50,000	27	28.1	12	44.4	1	1	3	—	8	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	
Total	3,497,000	1,746	26.0	923	52.8	59	6	219	13	464	24	2	19	11	17	70	2	31	—	—	25	20	—	—	—	36	
LAKE CITIES.																											
Buffalo, New York.	105,000	31	15.3	9	29.0	2	1	6	—	5	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
Rochester, New York.	105,000	31	15.3	9	29.0	2	1	6	—	5	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
Cleveland, Ohio.	210,000	95	28.5	66	69.4	10	1	3	1	39	2	—	3	—	—	3	—	—	—	—	4	2	—	—	—	1	
Detroit, Michigan.	140,000	100	37.2	65	65.0	—	—	—	2	34	5	—	—	—	2	5	—	4	—	—	—	—	—	—	—	—	
Chicago, Illinois.	650,000	320	25.8	212	66.2	11	1	21	3	123	16	—	—	—	2	4	2	—	—	—	7	3	—	—	—	—	
Milwaukee, Wisconsin.	147,000	92	32.6	78	84.7	5	—	2	—	41	2	1	—	—	—	2	—	—	—	—	—	—	—	—	—	—	
Total	1,252,000	638	26.5	430	67.3	28	3	34	7	242	25	4	15	2	6	13	—	9	—	—	11	6	—	—	—	5	
RIVER CITIES.																											
Pittsburg, Pa.	210,000	86	21.3	53	61.6	6	—	8	—	19	4	—	—	—	1	5	—	—	—	—	3	1	—	—	—	—	
Cincinnati, Ohio.	275,600	93	17.5	39	41.9	5	1	7	—	15	—	—	—	—	2	5	—	3	—	—	—	—	—	—	—	—	
Kansas City, Mo.	75,000	33	22.9	11	33.3	—	—	—	—	4	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
Indianapolis, Ind.	94,000	30	16.6	14	40.6	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Minneapolis, Minn.	100,000	65	33.8	43	66.1	1	—	4	—	31	6	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
Evansville, Ind.	34,000	25	38.3	14	56.0	—	—	4	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
St. Louis, Mo.	375,000	177	24.5	89	50.2	12	1	10	—	33	5	—	—	—	2	12	6	3	2	—	—	—	—	—	—	—	
Total	1,163,600	509	22.7	263	51.6	24	2	36	—	106	15	1	13	19	3	18	4	6	1	—	6	3	—	—	—	3	
SOUTHERN CITIES.																											
District of Columbia.	Wh. 133,800	50	19.4	16	32.0	—	—	7	—	9	1	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	
Richmond, Va.	Wh. 41,000	18	22.8	8	44.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Charleston, S. C.	Wh. 25,000	10	20.8	5	50.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Atlanta, Geo.	Wh. 30,000	11	19.0	6	54.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Nashville, Tenn.	Wh. 35,100	15	22.2	6	40.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Augusta, Geo.	Wh. 21,800	21	51.3	11	52.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Memphis, Tenn.	Wh. 20,000	10	26.0	4	40.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
New Orleans, La.	Wh. 171,000	86	25.4	27	31.7	3	—	12	—	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total White.	455,000	190	22.7	72	36.1	4	1	22	1	30	2	1	7	14	3	1	—	—	—	—	—	—	—	—	—	—	
Total Colored.	248,900	188	39.3	89	47.8	7	2	28	1	44	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Total in 33 U. S. Cities.	7,489,300	3,726	25.9	2,021	54.2	134	17	387	24	1,038	69	9	61	53	24	112	6	58	1	—	45	38	—	—	—	62	
For the five weeks ending August 2.	7,220,380	3,916	27.2	1,058	55.9	594	96	1,870	120	5,124	332	34	245	226	220	572	59	311	13	—	310	136	—	—	—	140	
July 19.	Total in 28 English Cities.	8,762,354	4,031	24.0	—	—	—	—	—	838	29	—	—	—	83	—	—	—	—	—	—	—	—	—	—	—	—
" 19.	" 8 Scottish Cities.	1,254,607	549	22.8	—	—	—	—	—	57	11	—	—	—	7	—	—	—	—	—	—	—	—	—	—	—	
" 19.	" 16 Irish Cities.	858,660	370	22.4	—	—	—	—	—	17	—	—	—	—	8	—	—	—	—	—	—	—	—	—	—	—	
" 19.	" 139 German Cities.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
" 19.	" 15 Swiss Cities.	455,537	225	25.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C. Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending August 2, 1884, in 33 cities of the United States, having an aggregate population of 7,489,300, there were reported 3,726 deaths, which is equivalent to an annual death-rate of 25.9 per 1,000, which is 1.3 below the average of the month, and 2.3 below the rate of the previous week. The rate in the North Atlantic cities was 26.6; in the Eastern cities, 26.0; in the Lake cities, 26.5; in the River cities, 22.7; and in the Southern cities, for the whites 22.7, and for the colored 39.3 per 1,000. Over one-half, or 54.2 per cent. of the deaths, were under 5 years of age.

Accidents caused 3.5, consumption 10.3, diarrhoeal diseases 27.8, and diphtheria 1.8 per cent. of all deaths. Diarrhoeal diseases caused 33.9 per cent. of all the deaths in the North Atlantic cities, 26.4 in the Eastern, 37.7 in the Lake, 20.8 in the River, and 14.9 for the whites and 23.4 for the colored in the Southern cities. The percentage of deaths from diphtheria was highest in the Lake cities—viz., 3.9. Typhoid fever caused 1.6, malarial fevers 1.1, and scarlet fever 0.9 per cent. of all deaths. The percentage of deaths from typhoid fever was highest among the whites in the South—viz., 3.5. Pneumonia caused 3.0, bronchitis 1.5, measles 1.2, small-pox 0.1, and whooping-cough 1.6 per cent. of the total mortality.

BOSTON, MASS.—C. E. Davis, Jr., reports 22 new cases of diphtheria, 42 of scarlet fever, and 9 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 17 new cases of diphtheria and 6 of scarlet fever.

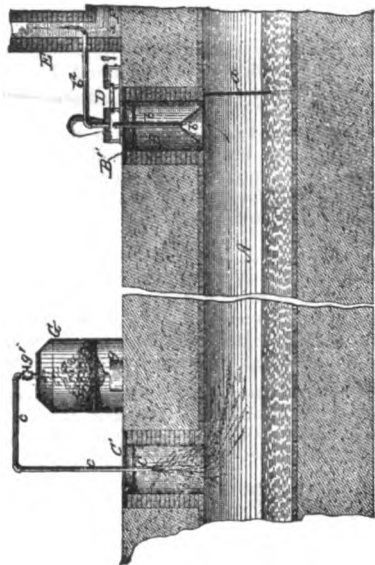
BALTIMORE, MD.—The weekly report of the Health Officer records 157 deaths, of which 84, or 53.5 per cent., were under 5 years of age. The annual death-rate for the whole population was 19.96 per 1,000, or 18.02 for the whites and 31.20 for the colored. Diphtheria caused 3 deaths, croup 2, scarlet fever 1, whooping-cough 2, typhoid fever 5, malarial fever 5, diarrhoeal diseases 32, consumption 23, acute lung diseases 4, and violence 6.

ENGLAND.—During the week ending July 19 the annual death-rate in the 28 principal cities of England and Wales was 24.0 per 1,000. The increased death-rate is due to the increased mortality among children, chiefly from diarrhoeal diseases. The highest annual death-rate from diarrhoeal diseases was 12.2 in Leicester, 6.8 in Preston, and 6.6 in Nottingham. Small-pox caused 23 deaths in London, 1 in Liverpool,

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

297,229. DISINFECTING SEWERS. EDWARD Z. COLLINGS, Camden, N. J., and CHARLES F. PIKE, Philadelphia, Pa. Filed March 12, 1883. (No model.) Issued April 22, 1884.

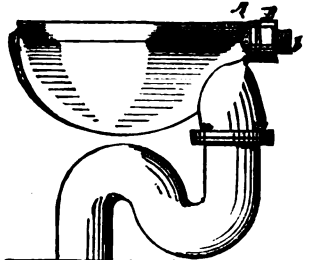


Claim.—1. The combination, with a sewer having man-holes, of a disinfecting apparatus consisting of a generator having a pipe extending into one man-hole, and a pump or exhaust placed at the other man-hole, substantially as described.

2. The combination, with a sewer having man-holes and a plate, of a disinfecting apparatus consisting of a generator having a pipe extending into the man-hole, and a pump or exhaust placed at the other man-hole, substantially as described.

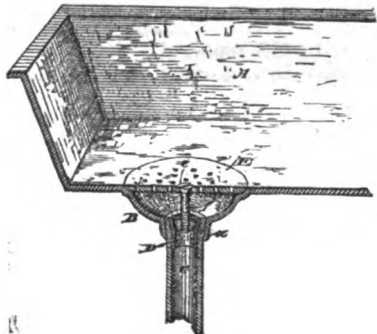
3. In combination with a sewer, a gas-generator and suction appliances having pipe *b*, with flaring end *b'*, substantially as shown and described.

297,321. WATER-CLOSET CONNECTION. HENRY C. WREDDEN, Boston, Mass. Filed January 12, 1884. (No model.) Issued April 22, 1884.



Claim.—The combination, with the flushing-pipe of an earthenware water-closet bowl, *A*, having the projections *a*, of a metallic surrounding and reinforcing connection, *B*, having the reduced screw-threaded part *b* and the inwardly-projecting parts *c*, the whole being cemented and held together by a suitable cement or bind, all substantially as herein specified and described.

297,404. SINK OR ANALOGOUS ARTICLE. HENRY L. JACOBS, Columbus, O. Filed October 20, 1883. (No model.) Issued April 22, 1884.

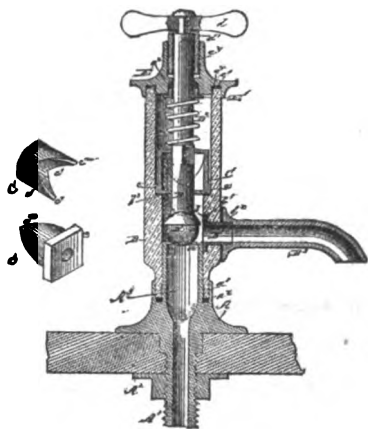


Claim.—1. The combination of the sink-neck, the expanding plug or ferrule, and the pipe expanded and clamped against the interior walls of the neck by the ferrule, and calked down around and upon the upper portion of the latter, as and for the purposes hereinbefore set forth.

2. The combination, with the body and neck of the sink, of the pipe inserted in the neck, the tubular plug or ferrule inserted in the pipe so as to clamp the latter in place in the neck, the strainer and the binding-screw passing down through the said strainer into a screw-threaded hole or socket provided for it in the ferrule or plug, substantially as and for the purposes hereinbefore set forth.

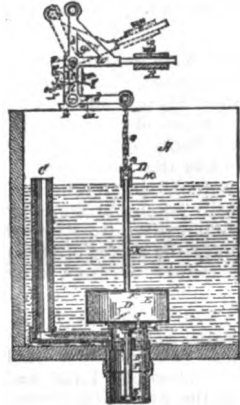
297,426. FAUCET. JAMES MCGINLEY, Chicago, Ill. Filed May 8, 1883. (No model.) Issued April 22, 1884.

Brief.—The upper part of the cam-box *C* may be provided with a pin or projection to engage with the cylinder *B* to hold the valve open.



Claim.—A self-closing faucet consisting of the base *A*, having valve-seat *a*, cylinder *B*, provided with nozzle *B'*, and formed with the shoulder *b*, above which it is formed angular in cross-section, and the cap *E*, having a stuffing-box and a socket, *c*, in combination with the two-part cam-box *C*, one part of which is formed square or angular and held stationary within the cylinder, and the other is fast upon and moves with the valve-stem, the valve-stem *D*, and the spring *D'*, adapted to hold the cam-box and valve properly seated and return the latter to place when released, all constructed and arranged to operate substantially as and for the purpose set forth.

297,455. VALVE FOR WATER-CLOSETS, ETC. WILLIAM SCOTT, Malden, Mass. Filed July 27, 1883. (No model.) Issued April 22, 1884.



Claim.—1. The combination, with the outlet or discharge of a tank for water or other liquid, of a chambered valve which has openings or passages for the ingress or egress of the liquid of the tank and of air, and is otherwise constructed and arranged that seated said discharge is closed and raised said discharge is opened, and from the then ingress of liquid said valve is again seated, emptying its contents, substantially as described, for the purpose specified.

2. The combination, with the seat *H* of the outlet or discharge *B* of a tank for water or other liquid, of a chambered valve, *D*, which has openings or passages *J* and *K* for the ingress and egress of the liquid of the tank and of air, and is provided with a stem, *P*, suitably guided, all so that when said valve is seated said discharge is closed and when raised said discharge is opened, and from the then ingress of liquid from the tank said valve is again seated, emptying its contents into said discharge, substantially as described, for the purpose specified.

3. The combination, with the outlet or discharge of a tank for water or other liquid, of a chambered valve which has openings or passages *J* and *K*, for the ingress and egress of the liquid of the tank and of air, and the port *M* of the air-passage made downwardly inclining and all otherwise constructed and arranged that seated said discharge is closed and raised said discharge is opened, and from the then ingress of liquid said valve is again seated, emptying its contents into said discharge, substantially as described, for the purposes specified.

4. The combination, with a tank for liquid, an outlet-pipe for the liquid, and a valve to said outlet-pipe, of two pivoted levers for operating said valve, one of said levers being constructed to slide at its pivotal point and to act on the other lever to open the valve when moved in one direction and when moved in the other direction to be shifted at its pivotal point, substantially as described.

5. A crank-lever, *N*, having arm *d*, connected to a valve of a tank for water or other liquid, and arm *l*, rounded at its outer end, in combination with an operating crank-lever, *Q*, having arms *s*, *t*, and *u*, its arm *t* at its outer end rounded, and an elongated fulcrum-bearing *w*, substantially as described, for the purpose specified.

6. The pivoted lever *N*, having long arm *d*, and short arm *l*, rounded at its free end, in combination with a lever, *Q*, having its short arm *t* rounded at its free end, and formed with an elongated fulcrum-bearing, *w*, whereby said levers are adapted to operate substantially as described.

7. The combination, with a tank for liquid, an outlet-pipe for the liquid, a float-valve for closing said outlet-pipe, provided with an air-inlet pipe and a liquid-inlet, the liquid-inlet being located at such point that when the valve is unseated the liquid will pass from the tank into said valve, and when seated the liquid will pass therefrom into the outlet-pipe of the tank, substantially as described.

298,176. SUPERHEATING-FURNACE. GOMER JONES, Washington, D. C., assignor to the Standard Vapor Fuel Iron and Steel Company of New York. Filed February 1, 1884. (No model.) Issued April 1, 1884.

298,218. LUBRICATOR. CHARLES H. PARSHALL, Detroit, Mich., assignor to the Michigan Lubricator Company, same place. Filed October 17, 1882. Renewed February 21, 1884. (No model.) Issued April 1, 1884.

298,215. LUBRICATOR. CHARLES E. PRASE, Dayton, O., assignor to the Buckeye Iron and Brass Works, same place. Filed January 7, 1884. (No model.) Issued April 1, 1884.

298,236. FEEDER FOR TILE AND SEWER-PIPE MACHINES. JOHN S. SMITH, Jackson, Mich. Filed January 28, 1884. (No model.) Issued April 1, 1884.

298,248. FIRE-ESCAPE. ROBERT STEVENSON, Muskegon, Mich. Filed January 29, 1884. (No model.) Issued April 1, 1884.

298,286. HYDRAULIC THEATRE APPLIANCE. ROBERT GWINNER, JOHANN KAUSKY, CARL DENGGE, and FRANZ ROTH, Vienna, Austria-Hungary. Filed January 9, 1883. (No model.) Patented in Germany June 6, 1882; in England June 19, 1882, No. 2,889; in France June 24, 1882, No. 149,754; and in Austria-Hungary August 11, 1882, No. 18,324 and No. 31,163. Issued April 1, 1884.

298,289. PROCESS OF GENERATING GAS. GOMER JONES, Washington, D. C., assignor to the Standard Vapor Fuel Iron and Steel Company of New York. Filed January 11, 1884. (No model.) Issued April 1, 1884.

298,290. GAS-GENERATOR. GOMER JONES, Washington, D. C., assignor to the Standard Vapor Fuel Iron and Steel Company of New York. Filed January 20, 1883. Renewed January 11, 1884. (No model.) Issued April 1, 1884.

298,298. FIRE-ESCAPE. EDWIN F. SHERMAN, Springfield, Mass. Filed August 22, 1883. (No model.) Issued April 1, 1884.

298,318. BRACING THE PILES OF PIERS. AARON B. BURTON, New York, N. Y., assignor, by mesne assignments, to the Driven Screw Post and Pile Company, same place. Filed August 4, 1883. (No model.) Issued April 8, 1884.

298,324. FIRE AND WATER PROOF PAINT. MARION O. FISHER, Allen's Hill, N. Y. Filed January 9, 1884. (No specimens.) Issued April 8, 1884.

Claim.—The fire and water proof paint compound herein described, consisting of coal-tar, yellow ochre, mineral paint, sulphur, alum, and talc, compounded in the manner and proportions substantially as herein set forth.

298,337. APPARATUS FOR THE PURIFICATION OF WATER. ALBERT R. LEEDS, Hoboken, N. J. Filed September 13, 1883. (No model.) Issued April 8, 1884.

298,340. GAS-ENGINE. HIRAM S. MAXIM, Brooklyn, N. Y. Filed October 31, 1883. (No model.) Issued April 8, 1884.

298,341. ELECTRICAL IGNITING DEVICE FOR GAS-ENGINES. HIRAM S. MAXIM, Brooklyn, N. Y. Filed January 12, 1884. (No model.) Patented in France October 6, 1883. Issued April 8, 1884.

298,390. OIL-CUP. ISAAC H. CONGDON, Omaha, Neb. Filed February 1, 1884. (No model.) Issued April 8, 1884.

298,398. SCREW-CUTTING DIE. JAMES M. DODGE, Indianapolis, Ind. Filed November 22, 1883. (No model.) Issued April 8, 1884.

298,394. COUPLING DEVICE. DANIEL P. DRISCOLL, Pittsburg, Pa. Filed October 17, 1881. (No model.) Issued April 8, 1884.

298,398. BRICK NOZZLE FOR GAS-FURNACE PIPES. JOHN EVANS, Etta, Pa., assignor of one-half to George A. Chalfant, same place. Filed June 1, 1883. (No model.) Issued April 8, 1884.

298,399. HEATING FURNACE. JOHN EVANS, Etta, Pa., assignor of one-half to George A. Chalfant, same place. Filed June 1, 1883. (No model.) Issued April 8, 1884.

298,419. FIREMAN'S TOWER. EUGENE B. MAGNUS, South Norwalk, Conn. Filed January 15, 1884. (No model.) Issued April 8, 1884.

298,486. HOSE. JOHN MURPHY, Brooklyn, N. Y. Filed January 21, 1884. (No model.) Issued April 8, 1884.

298,477. TILE-MACHINE. JOHN S. SMITH, Jackson, Mich., assignor of one-half to Theodore G. Bennett, same place. Filed November 30, 1883. (No model.) Issued April 8, 1884.

298,488. STREET-CLEANING MACHINE. BREKMAN VAN GAASBEEK, Mount Vernon, N. Y. Filed September 28, 1882. (No model.) Issued April 8, 1884.

298,502. FIRE-ESCAPE. CHARLES BINGLEY ANDERSON, Maysville, Ky. Filed April 28, 1883. Renewed March 5, 1884. (No model.) Issued April 8, 1884.

298,507. MACHINE FOR PRESSING ARTIFICIAL BLOCKS OR BRICKS, &c. ALBERT BALL, Claremont, N. H., assignor to the Sullivan Machine Company, same place. Filed April 11, 1883. (No model.) Issued April 8, 1884.

298,540. WRENCH. DWIGHT MORSE DE SILVA, Corning, N. Y. Filed December 4, 1883. (Model.) Issued April 8, 1884.

298,548. AIR-FILTER. HENRY FLAD, St. Louis, Mo. Filed June 14, 1883. (No model.) Issued April 8, 1884.

298,581. WOOD PAVEMENT. JAMES KERR, London, England. Filed December 18, 1882. (No model.) Patented in England February 15, 1877, No. 627; in France November 30, 1881, No. 146,143; in Belgium December 12, 1882, No. 59,839; and in Italy July 16, 1883. Issued April 8, 1884.

298,587. BURNER. ANDREW B. LIPSEY, West Hoboken, N. J., assignor to William Bell, New York, N. Y. Filed May 21, 1883. (No model.) Issued April 8, 1884.

298,616. ROOFING-TILE. BENJAMIN F. POWERS, GEORGE E. NEEDHAM, and JAMES HAYES, Cleveland, O.; said Hayes assignor to said Powers and Needham. Filed January 2, 1884. (No model.) Issued April 8, 1884.

298,650. FIRE-ESCAPE. ANDREW TURNBULL, New Britain, Conn. Filed April 16, 1883. (No model.) Issued April 8, 1884.

298,658. COMBINED ANVIL, VISE, AND DRILL. JAMES WEATHERS, Indianapolis, Ind., assignor of one-half to John A. Robbins, same place. Filed November 14, 1883. (No model.) Issued April 8, 1884.

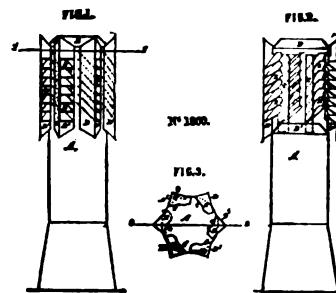
298,664. MERCURY GAS-GOVERNOR. JOHN D. AVERELL, New York, assignor to William Curry, Brooklyn, N. Y. Filed February 2, 1884. (No model.) Issued April 8, 1884.

298,678. COMBINED WATER-FILTER AND COOLER. FRANK E. CADY, Auburn, N. Y. Filed December 5, 1883. (No model.) Issued April 8, 1884.

298,681. ROCK-DRILL. GEORGE MCC. DEBBY, Astoria, N. Y. Filed June 20, 1883. (No model.) Issued April 8, 1884.

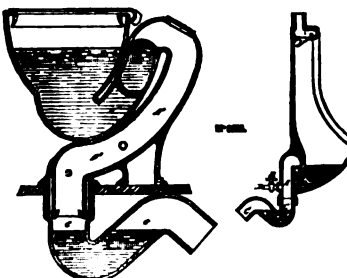
English Patents.

1,800. EXHAUST CHIMNEY-TOP AND ROOF-VENTILATOR.



ARTHUR CHARLES SMITH, 114 Wells Street, Camberwell, in the county of Surrey. Prov. Spec. January 19, 1884. (Price 6d.)

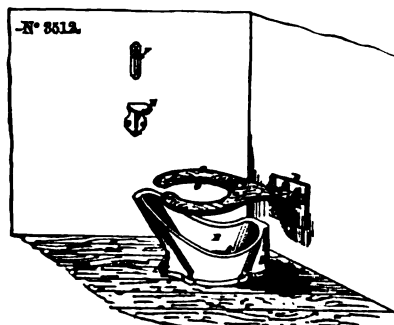
3,488. IMPROVEMENTS IN AND CONNECTED WITH WATER-CLOSETS, URINALS, LAVATORIES, BATHS, AND SERVICE CISTERNS.



This invention, which relates to water-closets, urinals, baths, lavatories, and service cisterns, has special reference to improved arrangements of syphon-traps fitted in connection therewith, or adapted thereto.

JOHN FAIRBAIRN, of the city and county of Edinburgh, plumber. Prov. Spec. July 16, 1883. Letters patented January 15, 1884. (Price 6d.)

3,512. IMPROVEMENTS IN OR CONNECTED WITH WATER-CLOSETS.



This invention, which relates to improvements in or connected with water-closets, has reference to a mode of constructing the seats thereof, so as to avoid the necessity of bringing the person into contact with the usual wood framework, and as a consequence to avoid the risk of contagion which is daily encountered in hotels, railway stations, and other public places.

EDWARD GILBERT and ARTHUR EDWARD GILBERT, both of Dundee, in the county of Forfar. Prov. Spec. July 17, 1883. (Price 6d.)

Association News.

PROVIDENCE, R. I., MASTER PLUMBERS.—The association held its regular monthly meeting August 7, the President in the chair. The minutes of the last meeting were read and approved. Reports of the different committees

were then made. A circular from Andrew Young, President of the National Association of Master Plumbers, was read, as already published in THE SANITARY ENGINEER. The following resolution was unanimously adopted: "Resolved, That we, the Master Plumbers' Association of Providence, R. I., and vicinity, do tender our services as an auxiliary sanitary corps, in accordance with the suggestions of the President of the National Association of Master Plumbers of the United States." The Corresponding Secretary was instructed to communicate to the State Board of Health the action taken by the association. The appointment of a sanitary committee, as provided for at the last convention at Baltimore, was then brought up. After some discussion it was left to the Executive Committee. Some private business took up the rest of the evening, when the meeting adjourned at a late hour. Our correspondent adds: "There is now no doubt but that this association will prove a grand success, and be a great benefit to all its members. They are not idle."

CHICAGO MASTER PLUMBERS.—The association met August 6, President Edward Baggot in the chair, and William B. Oliphant secretary. It was voted, on motion of J. J. Hamblin, that the per capita tax levied by the Executive Committee of the National Association, amounting to \$120, be paid. It was ordered that the Exhibit Committee show the appliances "dry" till adequate water facilities could be secured for the association's permanent exhibit of plumbers' goods. Fifty dollars, or about one-third the sum netted from the February banquet, was turned over to the Library Committee, who are showing excellent results from their expenditures, and have lately received some further valuable donations, especially from Congressman George R. Davis, of this city, who was given a vote of thanks. Then the Chair, after consultation in the ante-room with Messrs. Young, Murray, Wade, and Griffith, announced the following standing committees for the year, and on motion of Andrew Young, President of the National Association—who, by the by, vetoed, as soon as he got home, any celebration of that honor, and is only celebrating it by harder work for both the national and local welfare of the craft—the chairman of each committee presently handed in a notice of when his committee would get down to business by holding the first meeting: Warehouse Committee—William S. McGraw, James H. Roche, Patrick Harvey, Daniel Rock, George J. Stokes, William S. Verity, David Whiteford, Jacob Weber, David Bain, James R. Mills, Charles Breyer, C. J. Brooks. Library Committee—Alex. W. Murray, Elias C. Brown, Frank E. Ruh, Martin Moylan, James Monahan. Conference Committee—William Thompson, Charles J. Herbert, Thomas Conlin. Sanitary Committee—Robert Griffith, Peter Williams, George Alles, George Tipple, Thomas O'Malley, Frank E. Ruh, John Schuester, William Gay, Richard Graham, William Neustadt. Auditing Committee—J. L. Pattison, William Sims, J. D. Alcock. Legislative Committee—Hon. P. Sanders, Joseph Riley, Thomas Kelly, Thomas Havey, James Bassett. License Committee—Andrew Young, Hugh Watt, M. J. Corboy. Apprenticeship Committee—J. J. Hamblin, J. J. Clark, William Wilson. Arbitration Committee—William B. Oliphant, Robert McCulloch, P. L. O'Hara, John Dempsey, John Dunn.

A STATE SANITARY COUNCIL will be held at Elizabethtown, Ky., October 1 and 2, under the auspices of the Kentucky State Board of Health. The subjects to be discussed will be the following: The Prevention of Contagious and Infectious Diseases; Special Precautions to be used against Cholera; The Sanitary Problems of Elizabethtown; Adulterations of Foods and Medicines; The Relations of the School to Sanitary Work; The Relations of the Medical Profession to Sanitary Work; The Physical Dangers of Alcoholic Beverages; Personal and Domestic Hygiene; The Preservation of the Eye-Sight; Ventilation; Sewerage; The Disposal of the Dead. The Secretary of the Board is Dr. J. N. McCormack, Bowling Green, Ky.

MR. E. STANFORD, in a lecture before the Society of Arts on the "Economic Application of Sea-weed," stated that in the distillation of the sea-weed for the purpose of obtaining iodine gas was given off of sufficient luminous power to be lighting the works. On account of the sodium salts present the gas burns with a strong monochromatic yellow flame. Ammonia and tar are also yielded by the distillation, the former being utilized as a manure and the latter for the roof of the works.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Aug. 2.....	25.29	18.53	20.78	28.08	27.16	18.06

E. G. LOVE, Ph.D., Gas Examiner.

THE Gas Institute of England has presented the Birmingham medal to Mr. Frederick Siemens, of Dresden, in appreciation of his services and inventions in connection with the gas industry.

THE following is a list of the papers read at the June meeting of the Gas Institute:

(1) "A Consistent Method of Estimating the Illuminating Power of Gases of Different Qualities." By F. W. Hartley and C. Heisch. (2) "The Comparative Advantages of Dry and Wet Gas-Meters." By T. Travers. (3) "The Application of Gas for Heating Bakers' Ovens." By W. J. Booer. (4) "The Advantages of a Uniform Standard for the Sale of Residuals." By F. C. Humphrys. (5) "Gasholder Crowns." By F. S. Cripps. (6) "Experience with Generator and Regenerator Furnaces (Side by Side) for Heating Retorts." By W. A. Valon. (7) "The Determination of the Calorific Power of Coal-Gas." By F. W. Hartley. (8) "Harding's Improved Counter as a Substitute for the Old Meter Index." By T. W. Harding. (9) "On the Construction of a Gasholder Tank in Porous Rock." By W. King. (10) "Reduction of Sunday Labor in Gas-Works." By G. T. Livesey. [Taken as read: "The Calorific Value of Coal." By J. Paterson, F. G. S.]

ELECTRIC-LIGHTING IN THEATRES.—There are 2,862 lamps in the Edison installation in the Teatro della Scala, at Milan, this being perhaps the largest installation of its kind in existence. It has been running since last winter without the slightest hitch.

THE *Engineer* says that the most prominent want of electricians at the present time is a testing establishment, well equipped with engines, dynamos, workshops, etc., where inventors can experiment upon and perfect their inventions, and where accurate and impartial tests can be made.

SEÑOR MEXIA has been delegated to represent Mexico at the International Electrical Exhibition at Philadelphia.

THE ventilating-shaft over the sunlight burner in the Royal Albert Hall, South Kensington, recently caught fire, and but for prompt action might have resulted in a serious loss. Large burners or clusters of burners, similar to the "sunlight," should never be used unless so protected as to be perfectly safe.

THE Faure Electric Accumulator Company has decided to wind up its affairs.

Revue Industrielle states that the expenses connected with the electrical laboratory of M. Mounier, are defrayed by certain gas companies.

CHICAGO.—Over the Mayor's veto, the City Council gives to the Chicago Gas-Light & Coke Company \$1.65 per thousand cubic feet for gas used in the first seven months of this year and \$1 for the remaining seven months. To citizens the price has all along been \$1.

ST. JOSEPH, MICH., is to be lighted by electricity, the Vandepoele system having been adopted.

PARTIES in the interest of the Excelsior Company argued before Attorney-General Van Riper, of Michigan, on July 15, for the filing of a bill enjoining the Brush Electric-Light Company from proceeding under its contract with the city to light the streets of Detroit. It was charged the contract was illegally made, and would put the city to unnecessary cost in obtaining light. The Attorney-General consented to the filing of a bill in his name enjoining the Brush Company. Judge Chipman, of the Superior Court of Detroit, has since granted an injunction to restrain the city from carrying out the contract with the Brush Electric-Light Company to light the city with electricity. The case cannot be heard in the Supreme Court before October, and in the meantime the Brush Company continues the work of erecting its towers, and proposes to begin lighting the city August 15.

Notes.

CONSTRUCTION.

THE Rockford, Illinois, city water-works is to be supplied by the Holly Manufacturing Company with one of the Gaskill compound high-duty pumping-engines, of 4,000,000 gallons daily capacity, which is guaranteed by the builders to show a duty of at least 80,000,000 foot-pounds of water per 100 pounds of coal.

FOR the heating and ventilation of a school building in the Fourth Ward, and also one in the Tenth Ward of Jacksonville, Fla., proposals were received July 25, as follows: George H. Ennis, the Rutan system, \$5,264 for both buildings; M. M. Mahony, \$3,200 for both; W. A. Sherman, \$3,000 for both; J. C. Henderson, \$3,200 for both.

ANSONIA, CONN.—The Warden and Burgesses of the village have received a report from Mr. F. N. Owen, of New York City, on the disposal of the sewage. Mr. Owen presents two alternatives: Either the carrying of the trunk-sewer across the Naugatuck River below the village and dam, by an inverted siphon, to a large island in the Naugatuck, then by a cast-iron outfall-sewer through the island to its lower end, discharging into the tide-water of the Housatonic River below the junction of the Naugatuck; or, after crossing to the island by inverted siphon as before, the collection of the sewage into a large automatic flush-tank, to be discharged into a system of open-jointed tiles, laid just below the surface of the island, the island to be also underdrained to carry off the effluent. The village has the report under consideration, and will probably adopt the first plan.

ROCHESTER, N. Y.—Under date of August 4, James T. Gardiner, C. E., Director of the New York State Survey, addresses a letter to the Executive Board of this city, containing his report on the liability of Hemlock Lake to pollution. He finds that the natural conditions for a pure water-supply from Hemlock Lake are exceptionally good, but that there is some danger of contamination from some hundred of houses built near the shores of the lake. If the city had the power to exert compulsion, it would be easy to dispose of the sewage of all these houses without endangering the quality of the lake water. Mr. Gardiner suggests in conclusion that the condition of Rochester, with respect to Hemlock Lake, and of many other towns in the State with respect to their sources of water-supply, could best be improved by the passage of a general law enabling cities and towns to protect their sources of water-supply, by giving to the executive departments power to make and enforce regulations protecting them from pollution, the regulations to be subject to approval by the State Board of Health.

GEORGE M. CUSHING of New York has been awarded the contract on the Farm Pond Conduit; amount, \$68,459.80.

MESSRS. INMAN BROS., of 32 Liberty Street, New York, are at present engaged on a system of water-works for Prescott, a town of 6,000 inhabitants in Central Arizona. The plant consists of one large storage-reservoir, into which water is pumped from a creek by a Blake pump, steam being furnished from horizontal tubular boilers manufactured in Boston. There are in all about five miles of wrought-iron pipe, a part of which is a 10-inch main. This pipe makes a regular butt-joint, surrounded by a cast-iron sleeve and packed with lead as in the joints of ordinary cast-iron pipes. Wrought-iron was selected because of its greater lightness, a most important consideration, as Prescott is 50 miles from any railroad, and all material had to be hauled by mules at high freights. The total cost of the works will be \$65,000.—*Engineering News*.

NEWARK, N. J.—The Special Committee on Abatement of the Sewer Nuisance held a session, July 31, to consider the report of City Surveyor Schaeffer and Consulting Engineer Fteley. The committee sat with closed doors. A motion of intention to erect a pumping-station and constructing a 4-foot sewer from the mouth of the Peddie Street sewer to the bay was unanimously agreed to.

BIDS for reconstructing the County Jail at Salem, Mass., will be received until August 18. The main building will be of granite, and additions of brick, after plans of Rufus Sargent, architect. The jail will accommodate 150 prisoners. Address, J. W. Raymond, E. B. Bishop, G. J. L. Colby, County Commissioners.

NEWAYGO, MICH., will issue bonds to the amount of \$10,000, for the purpose of providing water-works.

SOUTH CHICAGO.—The Government will expend this season the \$20,000 appropriation to improve the harbor. The chief improvement will be to extend 200 feet the south pier at the entrance to Calumet River. The \$50,000 appropriation for deepening and widening the river to the uniform width of 200 feet will also likely be expended this fall. Also, a survey of the proposed ship-canal, from the Calumet River at Cummings to the town of Pullman, is on the tapis.

THE commissioners of the three new Insane Hospitals ordered built by the recent State Legislature met here yesterday. They are being built, as announced on several occasions in this correspondence, at Richmond, Logansport, and Evansville. The work is being rapidly and satisfactorily pushed. The excavations for the buildings at Logansport have been completed, and the building material, including 30,000 bricks, is now on the ground. An estimate of \$12,000 for work was allowed yesterday, making the total paid out to date \$20,000.

ATLANTIC CITY, N. J.—It is said that before the season closes the Drainage Company, which has been reorganized, will begin sewerage the town. A committee of council has been appointed by the Mayor to consider the building of a breakwater for improving the harbor.

THE new pumping-machine for the intercepting sewerage system in Milwaukee, Wis., will be built at once by E. P. Allis & Co. for \$29,500. Contract was let August 8, 1884.

HOOSICK FALLS, N. Y., wants a system of sewerage.

GOVERNMENT WORK.

SOME GOVERNMENT PROPOSALS.—Iron-work for Davis Island Dam, five miles below Pittsburgh, Pa., as follows: 62 tons of machinery, 6½ tons of wrought-iron pipe, 17 tons of cast-iron pipe, 9 tons of cast-iron plates, 28½ tons of bolts, nuts, and washers. Until August 26. William E. Merrill, Lieut.-Col. of Engineers, U. S. Engineer's Office, 82 West Third Street, Cincinnati, O.

Water-tanks for Davis Island Dam, as follows: Two water-tanks, with the necessary scaffolding to elevate the bottom of tanks forty feet above the coping of the lock walls. Until August 26. William E. Merrill, Lieut. Col. of Engineers, U. S. Engineer's Office, 82 West Third Street, Cincinnati, O.

Great Kanawha River Improvement—Proposals for building dam No. 6, about four miles below Charleston, will be received until noon of August 25, 1884. William P. Craig-hill, Lieut.-Col. of Engineers, U. S. Army.

POST-OFFICE, ETC., POUGHKEEPSIE, N. Y.—Synopsis of bids for stone and iron-work and superstructure, opened August 6: Class I. masonry, etc.—Elias Spross, \$16,858; William B. Kimlin, \$16,312; M. Giblin, \$22,500; Power & Vangile, \$17,500; J. M. Marshall, \$29,950. Class II., iron-work—James McKinney, \$2,020.10; W. H. Jackson & Co., \$2,100.

IMPROVEMENT OF POTOMAC RIVER, NEAR WASHINGTON, D. C.—Proposals for dredging opened August 4, 1884: Section II.—D. E. Culver & Co., New York, 11½ cents per cubic yard; American Dredging Co., Philadelphia, Pa., 16 cents per cubic yard; D. Constantine, Baltimore, Md., 13½ cents per cubic yard; Thomas P. Morgan, Washington, D. C., 13½ cents per cubic yard; P. Sanford Ross, Jersey City, N. J., 13½ cents per cubic yard; Atlantic Dredge Co., Brooklyn, N. Y., 13½ cents per cubic yard; Morris & Cummings Co., New York, 15 cents per cubic yard. The contract was awarded to D. E. Culver & Co.

SYNOPSIS of bids for laying sewers in Washington, D. C.:

12"-pipe, 1,765 ft.—Thos. McCann, \$1.30 per ft.; Wheeler & White, \$1.36; 15"-pipe, 2,745 ft.—Thos. McCann, \$1.40 per ft.; Jno. Cudmore, \$1.24; Wheeler & White, \$1.50; 18"-pipe, 6,635 ft.—Thos. McCann, \$1.50 per ft.; Wheeler & White, \$1.70; Jno. Cudmore, \$1.34; M. Shea, \$1.10; 21"-pipe, 5,630 ft.—Thos. McCann, \$1.75 per ft.; Wheeler & White, \$1.73; Geo. Courtney, \$1.15; 24"-pipe, 9,070 ft.—Thos. McCann, \$1.85 per ft.; Wheeler & White, \$2.02; 2'x3' brick, 2,865 ft.—Jas. F. Kennedy, \$6.87 per ft.; \$19,682.55. Thos. McCann, \$3.50; Wheeler & White, \$4.13; Jno. Cox & Co., \$4.24; 2.25'x2.37' brick, 10,265 ft.—Jas. F. Kennedy, \$8.90 per ft.; \$91,358.50. Thos. McCann, \$3.75; Wheeler & White, \$4.63; Jno. Cox & Co., \$4.51; J. F. Joyce, \$3.90; 2.50'x3.75' brick, 1,940 ft.—

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THE SEPARATE-SYSTEM OF SEWERAGE AS APPLIED TO A LARGE CITY.

AN interesting discussion on the question of the sewerage of a growing city has been going on for some months in the Engineers' Club of St. Louis. On November 30, 1883, Mr. Octave Chanute, M. Am. Soc. C. E., the well-known and highly accomplished railroad engineer, who now resides in Kansas City, Missouri, read before the Academy of Science, in that city, a paper advocating the adoption of a system of sewers suited for the conveyance of sewage alone, excluding all storm-water. The reasons assigned for this were the superior healthfulness of small sewers, the saving of expense of construction, and the greater convenience of operation in a growing city, in which, as in Kansas City, the removal of sewage becomes necessary in advance of the grading and improvement of streets.

Basing his calculations on the cost of the sewers constructed already after the plans of Mr. W. B. Knight, M. Am. Soc. C. E., which he stated to be \$1,026 per acre of the sewered district, Mr. Chanute estimated that the sewerage of the whole city would cost \$2,982,514, while if in the 2,500 acres yet unsewered all storm-water were to be excluded, the cost of the whole system would be \$1,079,414, including \$150,000 to be expended on storm-water sewers when needed in certain localities.

These statements attracted the attention of Mr. Robert Moore, M. Am. Soc. C. E., who has had large experience in the construction and maintenance of sewers in St. Louis, Missouri, and on March 12, 1884, he read before the St. Louis Engineers' Club a paper reviewing Mr. Chanute's arguments and figures, and claiming that in any large city, and notably in Kansas City, the accumulation of water in the gutters during heavy rains and on steep grades is destructive and dangerous, and therefore storm-water sewers are a necessity, and that it will be cheaper to use them for house-drainage than to construct another system for that purpose, and questioning the superior sanitary efficiency of the small-pipe system for lack of evidence on the subject.

In reply Mr. Chanute went more into particulars than in his first paper, which was largely of a "popular" nature. He so far modified his original statement as to "confess that on the flat bottom-lands * * * he would advise probably the combined-system, while for the sharply undulating system on the hill * * * he advises the separate-system." He cited the case of Baltimore as a large city existing without storm-water sewers, "with notoriously clean streets," and thought that the "wise plan for Kansas City now to adopt is first to provide for the drainage of the cesspools, to stop the further pollution of the soil, and to take up the disposal of storm-waters only so fast as nuisance arises, especially as they can be confined to those short lengths where serious annoyance does occur, and then be placed at shallow depths, say from two to five feet, instead of being carried, as now, from ten to sixteen feet underground to drain the cellars." Changing his unit of comparison from acres to miles, he computed from the experience of Leavenworth, Kansas, that separate sewers would cost \$10,000 per mile, and from the experience of Kansas City, that the "combined" sewers would cost \$20,000 or more per mile, and as seven miles

were built last year, that \$70,000 a year would represent the difference of cost between the two systems for some years, or until the storm-water sewers became a necessity. Regarding damage and inconvenience, he stated that in some sixteen years' ownership of property on the main street leading to the river, he had not found the storm-water to be an "unendurable nuisance." So far this argument sounds well, but Mr. Chanute felt himself impelled to go into the sanitary question, and he quoted long passages from the remarkable paper which appeared in the second report of the New York State Board of Health about germs and bacteria and "ideal hot-beds" in large sewers, and gave conclusive evidence that he had never been in a well-built sewer by the following bit of sensational writing:

"Whoever has made an excursion in a combined sewer in time of drought, and observed the slime which covers the walls, the fungus growth to which it gives rise, and the feeble trickling stream meandering around masses of putrefying matter, while breathing the foul air which it generates, will not require much argument as to the offensiveness of large sewers."

He also evidently labored under the impression that when a flush-tank is discharged at the upper end of a sewer, its contents shoot down the whole length of the sewer in a solid mass, carrying everything before it. He ignored the rule of hydraulics, that the velocity depends on the slope, and assumed through his argument, as do many amateur advocates of the small-pipe sewers, that because the pipes are small the water must run through them faster.

Considerable space is wasted by both parties to the controversy in discussing the Memphis death-rate, and the question whether the fact that some of the original details of the Memphis sewerage have been changed in the light of experience detracts from the merit of the designer of the Memphis system. This kind of discussion is silly, and unworthy of seekers for truth who are not mere partisans.

Mr. Moore fired the latest shot of the campaign in a paper read on May 7, in which he uses up the "ideal hot-bed" very thoroughly, and it is to be hoped that it will cease to "fester" and "germinate" in the discussions of sewerage systems. Mr. Moore also pretty thoroughly settled the Baltimore business, by quoting from official reports passages which do not show "either notoriously clean streets or the contentment of the citizens."

On the question of economy, which we take to be the real one at issue in the controversy, as to whether the sewers of a town shall be large or small, both being supposed to be properly constructed, Mr. Moore showed that the difference of cost between laying storm-water sewers six feet deep instead of twelve feet, amounts to only about eight per cent. at a maximum, and will probably average not more than five per cent. The cost of combined sewers he estimated as averaging \$20,727 per mile, and shallow storm-water sewers \$19,700 per mile. The lower portion of the storm-water sewers will cost, however, more than this, or about \$25,277.50 per mile. The average of the small or separate sewers is given at \$10,000 per mile. Hence, to lay 100 miles of combined sewers will cost \$2,072,700, and to lay 100 miles of separate sewers and 42½ miles of shallow storm-water sewers will cost \$2,074,294. "That is to say, for the same expenditure we should in

the one case have a single system of sewers and complete removal of both house-drainage and storm-water, and in the other a complicated double system and nearly sixty per cent. of the storm-water still unprovided for, except by open gutters."

This argument is strong at first glance, but it is not conclusive after all, when we come to examine it closely. The question of time should be taken into account. There are many miles of streets in a growing city, the property on which could better bear an assessment at the rate of \$2 a front foot for a sewer at first, and \$3.50 five years later for a storm-water drain, than one of \$4 a foot at once for the combined sewer. A sewer receiving street-washings is apt to be a nuisance in an unpaved street, and population must grow rapidly, far ahead of pavements. It is entirely within the range of possibility that in certain sections of a growing city it may be advisable to lay two sets of sewers in this manner, the first one of small size and cost, for the carriage of sewage alone, the second one large enough to carry off the rainfall, to be built only when necessary. At the same time other sections which are under different conditions may be more beneficially treated in another manner. It may be that in some cases it will be cheaper to lay two sewers at once. We understand that in the new wards of New York City, wherever the streets are so wide that the cost of laying house-connections half-way across the street exceeds the cost of a pipe-sewer along the side of the street, two sewers are laid, one near each sidewalk. This is not in accordance with old-fashioned practice, but it is found to be more economical, and it is not impossible that in some entire drainage districts of a city, a study by an engineer who cared more for a good plan than he did for a system might prove duplicate sewers to be the cheaper.

It is not good engineering to tie one's self to any "system." There is no vital principle of sanitary science at issue in the dispute about separate or combined sewers, and an attempt to make it appear that there is may be put down everywhere and anywhere as exhibiting either ignorance or quackery. Every case must be independently considered in the light of its surroundings.

Mere general average estimates like those given in the papers under discussion are unreliable, and before Kansas City can decide intelligently as to which system is best adapted to its needs, it would be well to have a careful examination of the subject made by an impartial expert, one who is not committed to any "system," but has kept himself sufficiently aloof from partisan discussions to be able to consider the subject on its merits.

SPECIFICATIONS FOR HEATING.

Our attention is again called to a method largely pursued by architects when asking for proposals for steam-heating work.

The usual routine is to place the plans of a building before three or four invited bidders and ask them to propose a scheme for warming and ventilating, and state what amount of money they will carry it out for. In a recent case of this kind, the engineer of a large steam-heating establishment said, when asked why he did not bid on a certain job, "Why, there is no specification, and if I propose a good system, such as the building should have, my price will be so high I cannot get the work, and my time will go for nothing. We cannot enter such a competition, as the merits of the plans submitted usually go for naught."

We called the architect's attention to this, and asked him why he did not make a specification for steam-heating apparatus as well as for walls, floors, etc., of his buildings; when, to our surprise, he informed us he did—that he made a *specification of requirements*. This was not plain to us and we asked to see it. It ran thus:

"Specification for steam-heating for apartment-house.—In each parlor, library, dining-

room, and best bed-room there will be one radiator of sufficient size; in each rear hallway one radiator of sufficient size, and in the main hallway one large radiator, all to be bronzed, with nickel-plated valves, and with all pipes, both steam and return, and with two boilers set under the sidewalk, with sufficient power for elevators." Then followed the usual clause about "temperatures in zero weather, and that all must be done to the *satisfaction* of the architect."

We have no doubt this architect is conscientious enough and thinks he has done the best thing for his clients, but we can readily see the part such specifications play in the unsatisfactory work that is being done in some of our fine apartment-houses. The general complaint from many of these buildings are: "On cold days we cannot get warm enough, as the radiators are *too small*, and in very cold weather the engineer says he cannot keep up steam, as the boilers are *not large enough*, and we see nothing for it but to move out." In the meantime the architect is trying to force the steam-fitters into putting in a larger apparatus, or something of that kind, claiming that the work is not to his satisfaction.

Who is to blame for this state of affairs? Is it the steam-fitter? To a certain extent it is, for he could have stayed away and not tried to do an impossibility—*i. e.*, do the best and most ample work, and be the lowest bidder at the same time. But then a steam-fitter must live by his calling, and though he must do cheap work or do none at all, he cannot be said to be the advocate of an insufficient and hastily thrown-together apparatus forced on him by a "specification of requirements," which is not specific and which is not a specification any more than a request to build a house with "sufficient" foundations, and with "ample" walls, with "good and sufficient" roof, with doors and windows and all other appliances "in the usual manner," would be a specification for a town hall or public school-house.

The architect for his part should in his specifications state the number of square feet of surface he wants in each room, and its general class. Let him say what boiler surface is required, and how many of them and what they are to be made of. Let him designate the size of steam-pipes, the number of traps and pumps and their sizes or capacities, and go into the *minutiae* of detail that he would for the walls, foundation, woodwork, and plaster of a building, and there will be fewer failures in steam-heating apparatus.

To secure a good piece of work by many of the present methods, it is necessary to inform the steam-fitter that there is no one bidding against him. Then as a general thing he is capable of proposing a system, with sizes, etc., which will be ample and which will give general satisfaction to all concerned.

Many of the older architects, of late years, have come into the practice of making a thorough specification for steam-apparatus, as experience has pointed out to them the necessity for it, if their efforts to secure an effective heating and ventilation are to be successful. The mistaken notion, also, of not being willing to specify patented articles of known merit, tends to open a door for the very poorest class of goods, as many men who make fittings or valves, or can buy a fitting or a valve, are apt to use it regardless of quality, so long as it is cheap, if the architect is not sufficiently expert in the quality of such goods as to be able to judge for himself.

OUR BRITISH CORRESPONDENCE.

Dublin Sanitary Exhibition—Preliminary Report on the Housing of the Poor—The Designs for the New War and Admiralty Offices—Ship-Canal across Ireland—Drinking-Water for Travelers in Norway—Offensive Smells in House of Commons—The Inspectors of Factories.

LONDON, August 2, 1884.

A SANITARY exhibition will be held in the Royal Dublin Society's buildings, Ball's Bridge, Dublin, from September 30 to October 18 next, in connection with the Seventh Autumn Congress of the Sanitary Institute of Great Britain.

The exhibits will be classified as follows: Class 1, Building Materials, Construction, and Machinery; Class 2, Water-supply and Sewerage; Class 3, Heating, Lighting, and Ventilation; Class 4, Personal Hygiene, Food, and Disinfectants; and Class 5, Miscellaneous. Intending exhibitors must apply for space on or before August 30, to Mr. Box, 74a Margaret Street, London.

An interim report of the Royal Commission on the Housing of the Poor will, it is announced, be presented to the autumn session of Parliament in October next. This report will embody the evidence and recommendations of the commission with regard to London and England and Wales generally. The state of matters in Scotland and Ireland will subsequently be taken into consideration by the commission.

The judges appointed to consider the designs in the competition for the new offices for the Admiralty and War Departments have just issued their report. One hundred and twenty-eight designs were originally sent in, out of which number the judges selected nine, the authors of which were invited to enter into the second competition, for which further instructions and suggestions were issued. From these nine the judges selected three as possessing special merit, and, after full consideration of the relative merits of these three designs, "the judges were unanimously of opinion that, taking the plans and elevations together, and having regard to the conditions of the competition, Messrs. Leeming & Leeming have produced the best design," and they accordingly recommend that they be employed as the architects of the new offices. The nine selected designs will be exhibited to the public from Monday next, for one month, at 18 Spring Gardens, S. W. Messrs. Leeming & Leeming's design is pure palladian in style, and the buildings will, it is said, be erected in Portland stone.

Particulars have recently been published of the project for constructing a ship-canal across Ireland. The proposed canal will be about 127 miles long, and would contain thirty locks. The cost is estimated at £20,000,000, for ships of 5,000 tons, and, if built on this scale, the canal would be 200 feet wide at the surface and 100 feet wide at the bottom. The passage of a ship from end to end would occupy about thirty hours, and would be effected by a system of towage.

A correspondent writing to the *Times* gives account of a system prevailing in Norway for supplying travelers with fresh drinking-water *en route*. He says: "In the place at the top of the partition between two compartments usually occupied by a lamp there is a glass tank, with a small tap on either side. At the beginning of each journey the tank is filled with fresh water, in which a piece of ice is placed. Each compartment is furnished with a small drinking-glass, so that travelers may refresh themselves with a draught of ice-cold water at any time during the course of their journey."

It is said that the Select Committee appointed to investigate the causes of the offensive smells complained of in the House of Commons presented its report on Tuesday last. It finds, after careful examination, that the ventilation and drainage of the Houses of Parliament are in good condition, and that the disagreeable odors did not arise within the buildings; but it finds the Westminster sewer, which runs past the palace yard gates, is in such a condition as to create a nuisance. The committee recommends that the Local Government Board shall instruct one of its inspectors to examine further into these matters, with a view to such proceedings as may be found necessary, and that the committee should be reappointed next session to consider the inspector's report.

Her Majesty's Inspectors of Factories are either culpably negligent in the performance of their duties or they want a larger staff of assistants. I am informed that at the hearing of a case the other day, when Mr. Lakeman summoned a firm of printers for not having their premises lime-washed, he pressed for a heavy penalty on the ground that the defendants had so long deferred attending to his order, *which had been made two years and a half ago*. Surely such delay between making and enforcing the carrying-out of orders is calculated to bring the whole system into contempt, besides which the protection to workers in factories which is supposed to exist certainly *does not* under these circumstances. SAFETY-VALVE.

As we go to press, we learn of the death of Colonel J. J. Woodward, U. S. A.

PLUMBING AND WATER-SUPPLY IN
THE RESIDENCE OF MR. HENRY
G. MARQUAND.

No. VII.

(Continued from page 241.)

THE illustrations, Figs. 19 and 20, are views at opposite ends of a bath-room forming one of a suite on the second story.

To the right as you enter through the curtained doorway is the wash-bowl, a sitz-bath, and a foot-bath. The handles which operate the sitz-bath are on the end of the basin-slab, as shown. The water is admitted near the bottom through a single aperture, the hot and cold-water pipes being brought together after passing their respective cocks. The waste-valve and pull-rod are in the pipe *a*; *b* being the concealed overflow. The waste-pipe at the lower end of the pipe *a*, below the valve, runs to a bottle-trap below the floor, the cleaning-screw of which comes through the marble safe of the basin. The "back-air" pipe from the bottle-trap is shown coming through the safe and entering the wall above the bottom of the basin. Under the basin is an S-trap, shown by dotted lines, the "back-air" pipe of which joins the air-pipe from the bottle-trap. The square bath B is a foot-bath partly portable. When pushed in the door of the basin-stand can be closed, and no appearance of the foot-bath remains. A depression in the safe which protects the basin and sitz-bath is made immediately under the foot-bath. This depression is furnished with a bottle-trap, "back-aired" similar to the sitz-bath, the cleaning-screw of which is in the depression and not seen. A short waste-pipe from the bottom of the foot-bath extends into the depression completing the waste-connection from the foot-bath. The hot and cold-water faucets for the foot-bath are to be attached to the *tees* shown at the corners of the pipes leading to the basin-faucets, but which are not as yet applied. The straight pipes shown, rising under the basin-slab from the hot and cold-water pipe, are air chambers.

Figure 20 shows a bath-tub at the opposite end of the same room. The tub is heavy white porcelain, and is supported on adjustable brass legs (*c*), which rest on the marble safe. The pull of the valve in this case is at the corner of the tub, instead of occupying the usual position between the two faucets. The pipe *a* is the valve-pipe, and *c* the waste, *f* being the back-air pipe, and *d* the neck of a bottle-trap, with cleaning-screw. The overflow-pipe *b* does not enter the pipe *a*, but runs to the dip of the traps, as shown by the dotted lines.

The floor of the bath-room is of Tennessee marble of rather dark colors. The base is of the same marble of lighter shades, and the wainscoting is of colored glazed-tiles, the prevailing color being canary. The ceiling and walls are oil-painted.

(TO BE CONTINUED.)

A NEW METHOD OF TREATING LIME-WATERS.

IN some German factories, especially in dyeing establishments, a new process is employed in order to soften water which holds lime in solution. The process rests on the fact that magnesium-oxide, brought to red heat, easily absorbs—after hydration—the free carbonic-acid held in solution by natural waters. This brings about the precipitation of the calcium-carbonates which were held dissolved by the excess of carbonic-acid. The magnesia itself is then dissolved, and combines with the bicarbonate of magnesia in the water to form the carbonate.

The purification of the water, is moreover, according to Prof. Strohmann, of Leipzig, based on the decomposition of gypsum or sulphate of lime, which is associated with the carbonates in natural waters; for when there is no gypsum the hydrate of magnesium has no effect on the bicarbonate of magnesium, and no simple carbonate is formed. The water thus purified did not seem, at first, suitable for boiler-feeding; it was said that it attacked the old generators and filled them with mud. However, it was found later that the sulphate of magnesium dissolved in these waters raised to a high temperature reacted on the carbonate of lime, of which the boiler deposits are formed, and gradually formed sulphate of lime and of magnesia, thus changing into slime the deposit formerly adherent.—*Revue Industrielle*.

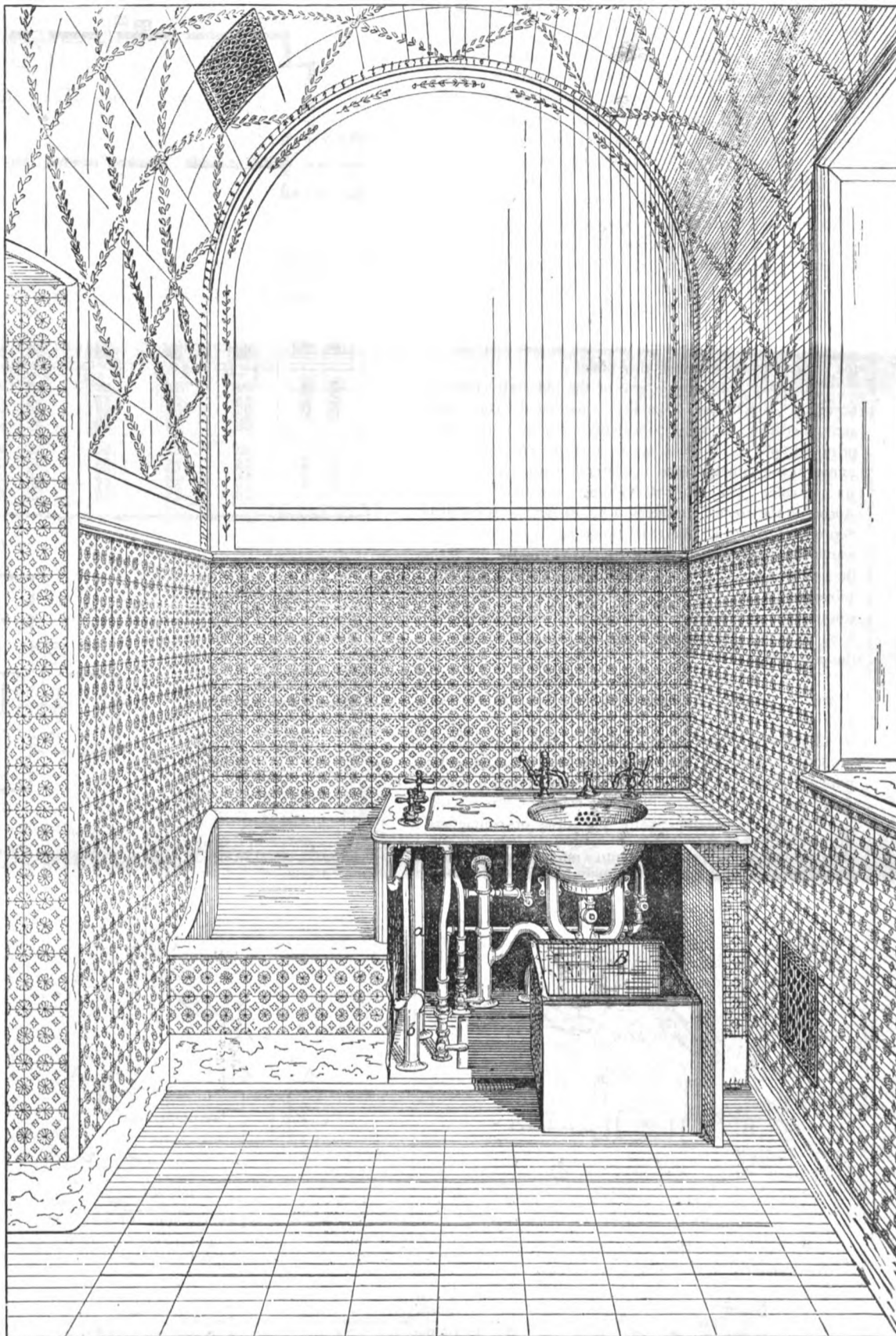


FIGURE 19.—VIEW IN BATH-ROOM—RESIDENCE OF MR. HENRY G. MARQUAND.

THE STATISTICAL WORKS OF DR. FARR.

THE *Sanitary Record* says: "It has long been the source of much regret among students of vital statistics, as well as among those practically interested in this branch of sanitary science, that the valuable statistical work of the late Dr. Farr is, from the form and manner of its publication, not generally available. The Sanitary Institute of Great Britain proposes, in these circumstances, to publish a selection from Dr. Farr's official reports, papers, and addresses, and has confided the selection and editing of this memorial of his labors to the capable hands of Mr. Noel A. Humphreys, of the Registrar-General's Office. It is proposed that the volume should consist of not less than 450 pages, 8vo., and that it be published at the price of 30s., or, to subscribers, one guinea, provided that the number of subscribers warrants the Institute in incurring the expense of publication. Intending subscribers are requested, therefore, to send in their names without delay to the Secretary of the Institute, in order that this council may be able to determine whether it will obtain sufficient support to justify it in publishing the book."

DR. LYMAN C. DARWIN, of Syracuse, reports that the health of that city during June has been excellent, with a death-rate a little lower than for the same month of 1883. There has been gratifying absence of any thing resembling an epidemic, and of any general disease.

IN the month of June the inspectors of the New Orleans Auxiliary Sanitary Association inspected 6,333 premises, housing 26,095 white, and 4,598 colored inhabitants, and found the following conditions: Lot-filling bad, 100; drainage defective, 63; crowded, 12; filthy yards, 108; privies good, 3,408; full or foul, 1,831; defective, 186; without flues, 1,602.

Water-supply—Hydrants, 840; cisterns and hydrants, 830; cisterns only, 4,461; no water-supply, 202; premises with wells, 325.

THE \$150,000 required for the completion of the Technical College at South Kensington, London, has been guaranteed, and the institution will be fitted up before the end of autumn.

IMPROVEMENTS IN THE HULL GENERAL INFIRMARY.

As a rule, attempts to improve old hospitals are very costly in proportion to the benefits secured, and it is often cheaper to construct entirely new buildings than to alter and repair the old ones so as to make them conform to modern views of hospital arrangement. But as it is usually difficult to raise the funds for a new structure, a temporizing policy is adopted, additions are built, and hand-to-mouth alterations are made to tide over present difficulties, and the results are very unsatisfactory.

The London *Lancet* has recently published an account of the improvements made in the Hull Infirmary, with illustrations, and from this paper we extract the following, thinking that it will be interesting and suggestive to those who are interested in hospital construction and management in this country. We are indebted to the courtesy of the *Lancet* for the accompanying plates:

"The Hull Infirmary is one of the old style corridor hospitals, which, as originally constructed, contained accommodations for about 70 patients. Figure 1 shows the principal floor of the building as it at present exists, the rooms being numbered to indicate the various additions since made. The original building consisted of three stories of the rooms numbered 1 to 10, and was opened September 1, 1784. In 1842 the wings containing the wards and rooms numbered 11 to 13 were added, in 1858 the wing containing the rooms numbered 14 to 17, and subsequently the other rooms numbered on the plan, the worst addition being the three stories of rooms numbered from 25 to 30, which closed in the only ventilated sides of the corridors.

"The alterations now adopted are shown in Figs. 2 and 3, and the details of the new wards are shown in Figs. 4, 5, 6, and 7.

"The block plans given in Figs. 8 and 9 show other proposed alterations, such as the erection of a new out-patients' department at the point marked K, and a wash-house and laundry at L. The block marked C was erected in 1874 as an isolation ward, but cases of contagious disease are hereafter to be sent to a separate hospital, and this building is to be converted into a nurses' home. When the alterations are completed the main building will accommodate 275 patients. The total cost of the improvements will be about \$150,000."

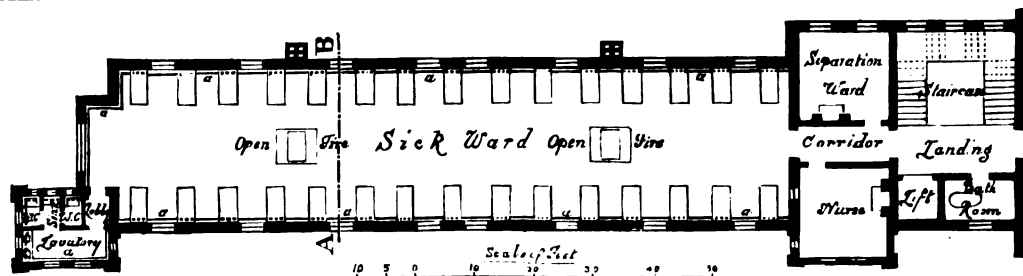


FIGURE 7.—PLAN OF FIRST FLOOR, S. E. WING.

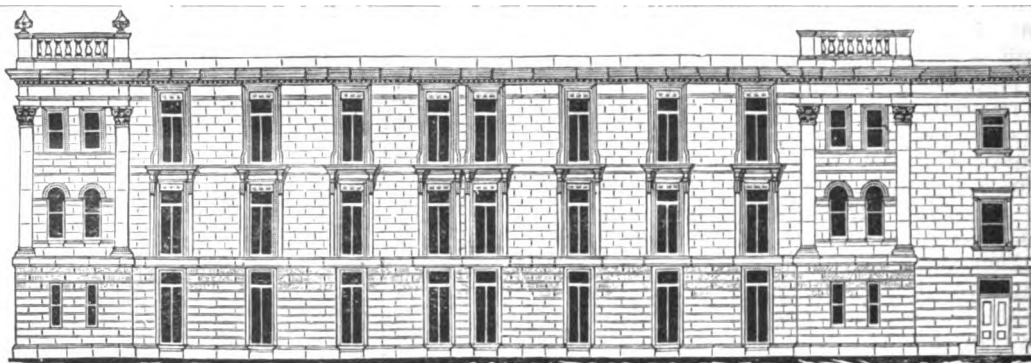


FIGURE 6.—ELEVATION.

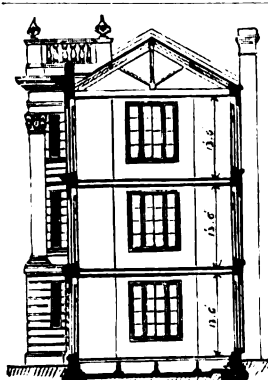


FIGURE 5. SECTION ON LINE A B.

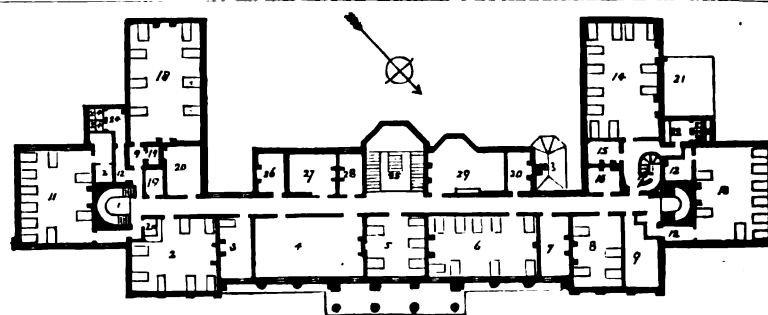


FIGURE 1.—PLAN OF FIRST FLOOR BEFORE ALTERATION.

Nos. 1, 10, 25, Staircases; 2, 3, 5, 6, 8, 11, 13, 14, 18, Sick wards; 4, Chapel; 7, 9, 28, Officer's bedroom; 12, 17, 19, Passages, lobbies, closets, etc.; 15, 16, 20, Duty-rooms; 21, Roof of operating-room; 22, 24, 28, Water-closets, slop-sinks, lavatories; 23, Roof over physician's consulting-room; 26, 30, Bath-rooms; 27, Assistant house surgeon's bedroom; 29, Operating theatre.

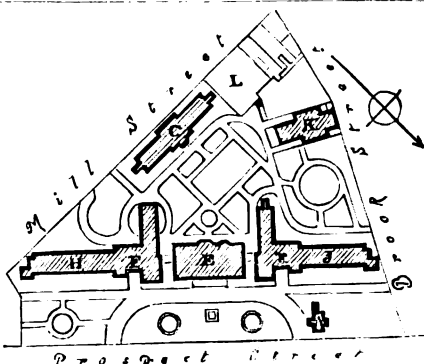


FIGURE 9.—PLAN OF SITE AS ALTERED.

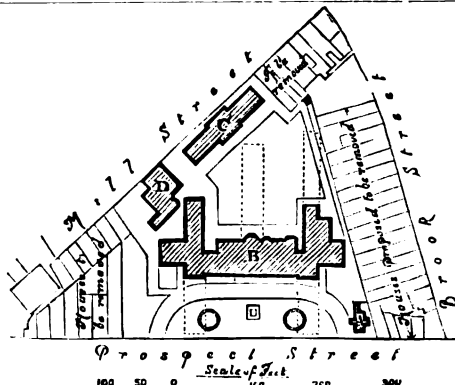


FIGURE 8.—PLAN OF SITE AT PRESENT.

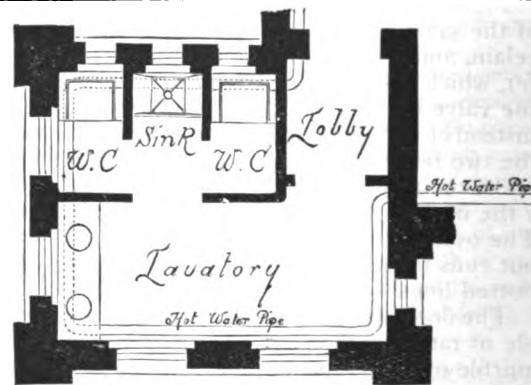


FIGURE 4.—PLAN OF WATER-CLOSETS.

A. Porter's lodge and entrance gates. B. Present main building. C. Infectious wards altered to nurses' home. D. Wash-house and mortuary. E. Administration offices. F. Sick wards remodeled. H. J. New sick wards. K. Out-patients' department. L. New wash-house and laundry. a. Hot-water pipes next walls.

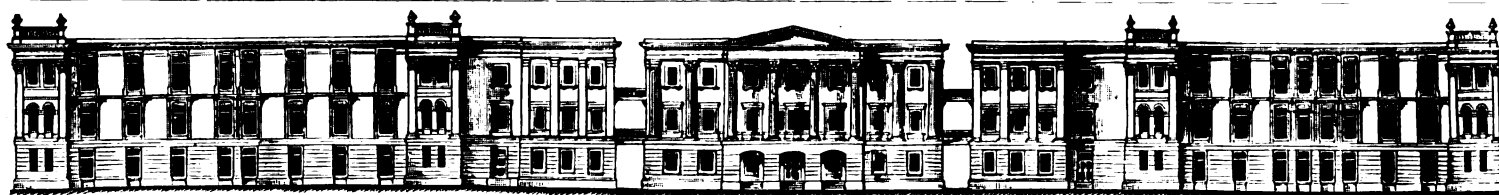


FIGURE 2.—FRONT ELEVATION AS ALTERED.

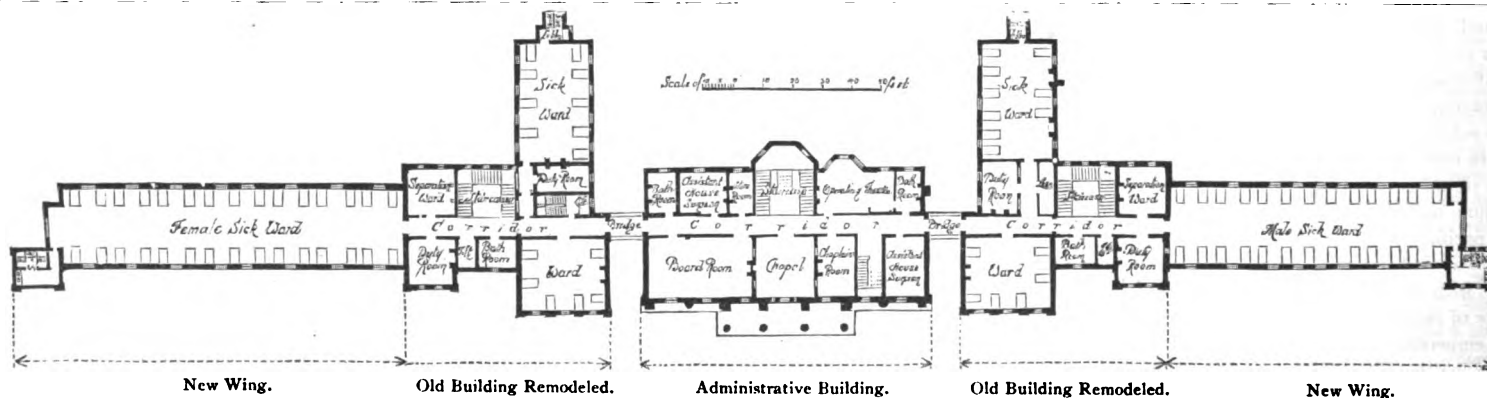


FIGURE 3.—PLAN OF FIRST FLOOR AFTER ALTERATION.

SEWAGE DISPOSAL.

SEWAGE SYSTEMS AND THE EPURATION OF SEWAGE BY IRRIGATION AND AGRICULTURE. By Henry J. Barnes, M. D. A paper read before the Suffolk (Mass.) District Medical Society, April 30, 1884, with discussion on the same, April 30 and May 21, 1884. *Boston Medical and Surgical Journal*, June 19 and 26, and July 24, 1884.

Why the author of this paper should speak of "systems of sewage" when he meant *sewerage*, and why he should transfer into English the French words *epuration* and *filtrage*, instead of translating them, are questions which puzzle the reader at the outset. There is traceable through the paper a certain affectation in using transferred French terms and idioms, which is annoying, to say the least, and produces an impression on the reader's mind that the writer was not thoroughly familiar with either language.

The arrangement of the facts stated is not very systematic, and consequently it is not easy to draw from the mass of interesting statistical matter given any clear idea of the progress and present condition of the efforts at purification of sewage by various methods. It is clear, however, that by irrigation of the soil and downward filtration results have so far been attained more satisfactory than those reached by direct treatment of the sewage by chemicals.

It is therefore urged that efforts should be made by the suburban towns near Boston to purify their sewage on land, rather than to attempt to convey it all to Boston Harbor, where it will probably create a nuisance in the future.

In the discussion which followed the reading of Dr. Barnes' paper, Mr. E. W. Bowditch, C. E., stated that he understood that Pullman, Ill., had abandoned irrigation and was discharging its sewage into Lake Michigan, but Mr. Elliot C. Clarke denied that this was the case, and Dr. Barnes produced a letter from Mr. E. T. Martin, the superintendent of the Pullman sewage-farm, in which he stated that the sewage is thoroughly purified on the land and creates no nuisance, and that the farm last year paid six per cent. on the money invested in it.

Dr. Faxon stated that some of the sewage of Boston, which is conveyed to Moon Island in the harbor by the new "improved sewerage works," came to shore in Quincy Bay, was "already creating a nuisance along the beach," but this was distinctly denied by Mr. Clarke, the engineer in charge of the works, who said that none of the sewage discharged ever turned into Quincy Bay.

Mr. E. S. Philbrick, C. E., questioned the practicability of obtaining in Massachusetts sufficient ground of a suitable character for sewage purification. Referring to the treatment of the Paris sewage at Gennevilliers, he said: "The success of these farms, as I am informed, is attributable to the fact that the delivery of sewage to the farmer is at his option, and not obligatory. Such a system can never be a reliable source of relief to a town so long as any considerable portion of the sewage flow is liable to be left undisposed of on a wet day."

Mr. Philbrick said that "irrigation puddles the surface, which, unless very sandy, cakes and hardens when drying, requiring frequent hoeing to pulverize the soil." To this Dr. Barnes opposed the counter-statement, that "the soil does not clog where systematic irrigation is practiced. The thin skin of impervious deposit when dried shrinks, cracks, and breaks up, the organic matter decays, and the soil is more pervious than where irrigation is not employed." Neither of these gentlemen gave his authority for these diametrically opposite assertions.

Dr. Barnes states in his paper that "if the surface irrigated is under cultivation the fertilizing matter is immediately utilized; if not, it accumulates without loss and transforms the poorest soil into land of extreme fertility." This opinion does not agree with the statements of Professor Robinson on page 23 of his "Sewage Disposal," as follows: "However well land may act as a purifier of sewage for sanitary purposes, it can only be relied on to utilize the manurial constituents of the sewage, according to the requirements of the crops for the time being assimilating them, and any excess of the supply of manure over the demand by the crops is not stored up for subsequent use, but is wasted, and passes off in the subsoil drainage either partially or wholly purified, according to the nature of the land and of its preparation to filter and oxidize the sewage passed through it. *Land is not made more fertile by filtering the sewage of a thousand people through an acre than it is if the sewage of a hundred only is applied.*"

As calling public attention to the necessity of preparing for what is inevitable, some method of safe disposal of the sewage of communities, such papers as this of Dr. Barnes and the discussion upon them are of great value. Crude

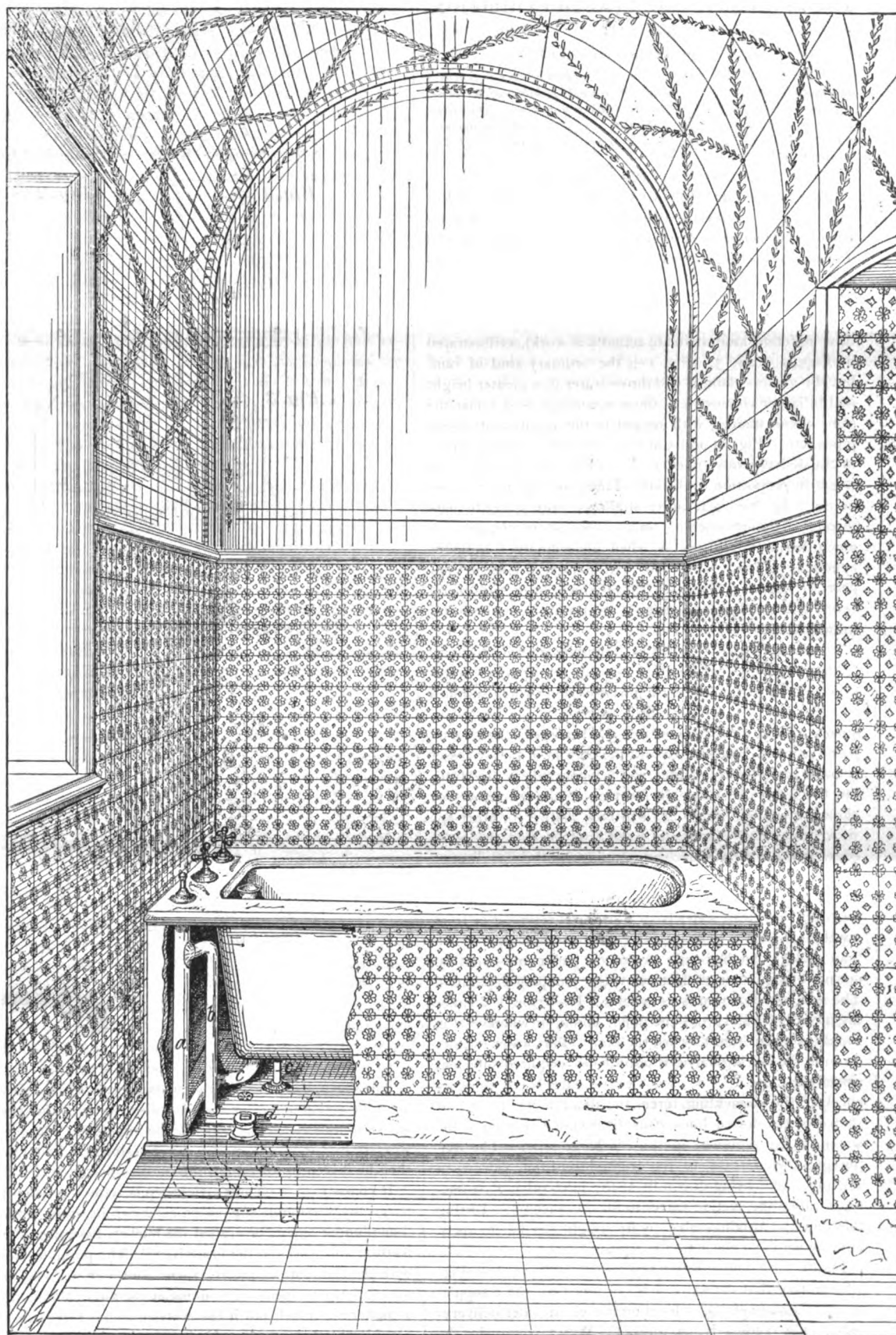


FIGURE 20.—VIEW IN BATH-ROOM—RESIDENCE OF MR. HENRY G. MARQUAND.

theories are apt to be set forth and a good deal of irrelevant matter brought in, but in the absence of actual experience in this country that is only to be expected at present. The great point is to arouse public interest on the subject to such an extent as to prevent the occurrence of such circumstances as happened lately in a growing village suburban to New York. A plan of sewerage was prepared by an engineer, which provided for the discharge of the sewage into a stream flowing through a district certain to be thickly populated at an early day. Some opposition being aroused, the village trustees called on two other engineers for reports on the plan. One of these reports approved the scheme, and was published. The other one objected to the scheme of disposal, and was suppressed, and never laid before the board or the public.

THE State Board of Health reports to Governor Cleveland that the nuisance at the Glen Cove Starch Works still exists, and should be abated.

PREPARATIONS AGAINST CHOLERA.—More, far more, can be accomplished now, in the way of safety and protection, than when the disease is upon us. Instant and energetic action should be taken toward cleansing the city. The finding and removal of all filth heaps, whether conspicuous or hidden in back yards or cellars; the ventilation and drainage of dwellings, and especially the prevention of overcrowding and consequent house-air poisoning, and the closure or removal of all buildings which are dangerous to life and health. The inspection force should be doubled or trebled, and their reports of dangerous places acted upon promptly. The people should be awakened to the threatened danger, and every effort should be made to fortify our city as speedily as possible to resist the approaching foe.—DR. LINDSLAY, *Health Officer of New Haven, Conn.*

THE Inspectors of the New York Building Department have pronounced the District Court Building, No. 154 Clinton Street, unsafe on account of overhanging coping.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XIII.

(Continued from page 245.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

EAST CENTRAL GALLERY B.

SHARP & CO., 11 Holborn Viaduct, London (Stand No. 456), have an attractive display of table-tops, or what are known in America as earthenware slabs and basins, several ornamental basins, and wall drinking-fountains. There are also exhibited in their space several hydraulic-rams and a double-acting lift and force-pump, made by Messrs. Tyffe & Co., 9 Rose Street, Aberdeen, Scotland. They have on view three different kinds (two are actually at work), as illustrated by Figs. 1, 2 and 3. Fig. 1 is the ordinary kind of ram, but the makers claim it will throw water to a greater height and in larger volume than those commonly used under the same circumstances, with regard to the supply and size of pipes, etc. Figs. 4 and 5 are an enlarged section and plan of the delivery-valve fixed at A. This valve is made much larger in proportion to the size of the ram than most others in use. By having it larger it allows more water to pass through; though opening only a very short distance, so much does not fall back as when an ordinary spindle or spherical valve is used. The driving-valve B does not appear to clack so loudly as those which have hard-metal faces, and the dome covering it confines the waste-water from splashing about so much.

Figure 2 is what is called a "pumping-ram," and is intended to be used where there is a liberal supply of water which is not fit for domestic purposes, but which supplies enough power for forcing clean water, which is limited in quantity, to any desired position. When used for this purpose the valve A is omitted and the bottom of the air-vessel is made perfectly water-tight, and a copper tube is fixed from the delivery-valve C to the bottom of the air-vessel, as shown by dotted lines. D is a thick leather (or other approved material) diaphragm fixed firmly around the outer edges, so that dirty water cannot mix with the clean water. The central portion is loose, so that it can freely move up and down. E is the inlet-valve, to which is attached a pipe for supplying clean water from a low-level reservoir or from a well. If from a well the water must not be deeper down than could be fetched with a common jack-pump—that is, not more than 26 or 28 feet below the pumping-apparatus. The action of this ram is as follows: The arrow F denotes the incoming water from the pond, brook, or wherever the supply is taken from to work the ram. This water escapes through the driving-valve B until it has acquired sufficient velocity to close it. The escape of the water being suddenly checked, the momentum forces the diaphragm upward, as shown by the dotted lines, thus displacing a portion of the water in the chamber up the discharge-pipe. The diaphragm then returns to its original position, causing a vacuum, water being drawn in at the inlet-valve E (sometimes called the suction-valve) to fill this vacuum. During this time the driving-valve by its weight has fallen open, and the whole of the action is repeated.

Figure 3 is a double-action ram, which is the same as Fig. 2, excepting that the valve A is not removed, and a supplementary air-vessel, G, is fixed on the clean-water delivery-pipe. The action is as follows: Water passes in the driving-pipe when the valve B closes; the impetus of the driving-water causes a small quantity to be forced through the valve A, and also acts upon the diaphragm, as explained for Fig. 2, so that a portion of the driving-water, although not fit for cooking, may be delivered at laundry, stable-yard, or into cattle-troughs, and clean or spring-water can be sent up to the residence at each pulsation of the driving-valve.

It is stated that the single-action ram, under favorable circumstances, will raise 80 per cent. of the available supply, and the double-action 60 per cent.; also, that in one case, at a gentleman's house, with a fall of three feet, water was raised to a height of fifty-seven feet, and in another case, with a fall of six feet, water was sent to the top of a house one hundred and twenty feet above the ram and fully half a mile distant from it.

The small screw H is for the purpose of filling the pumping-chamber with water when the ram is first started.

In connection with these water-machines is shown an inlet sluice-valve, which has a clear water-way, and at the same time has no grooves at the sides for the water to impinge against and so retard its free flow or break its velocity.

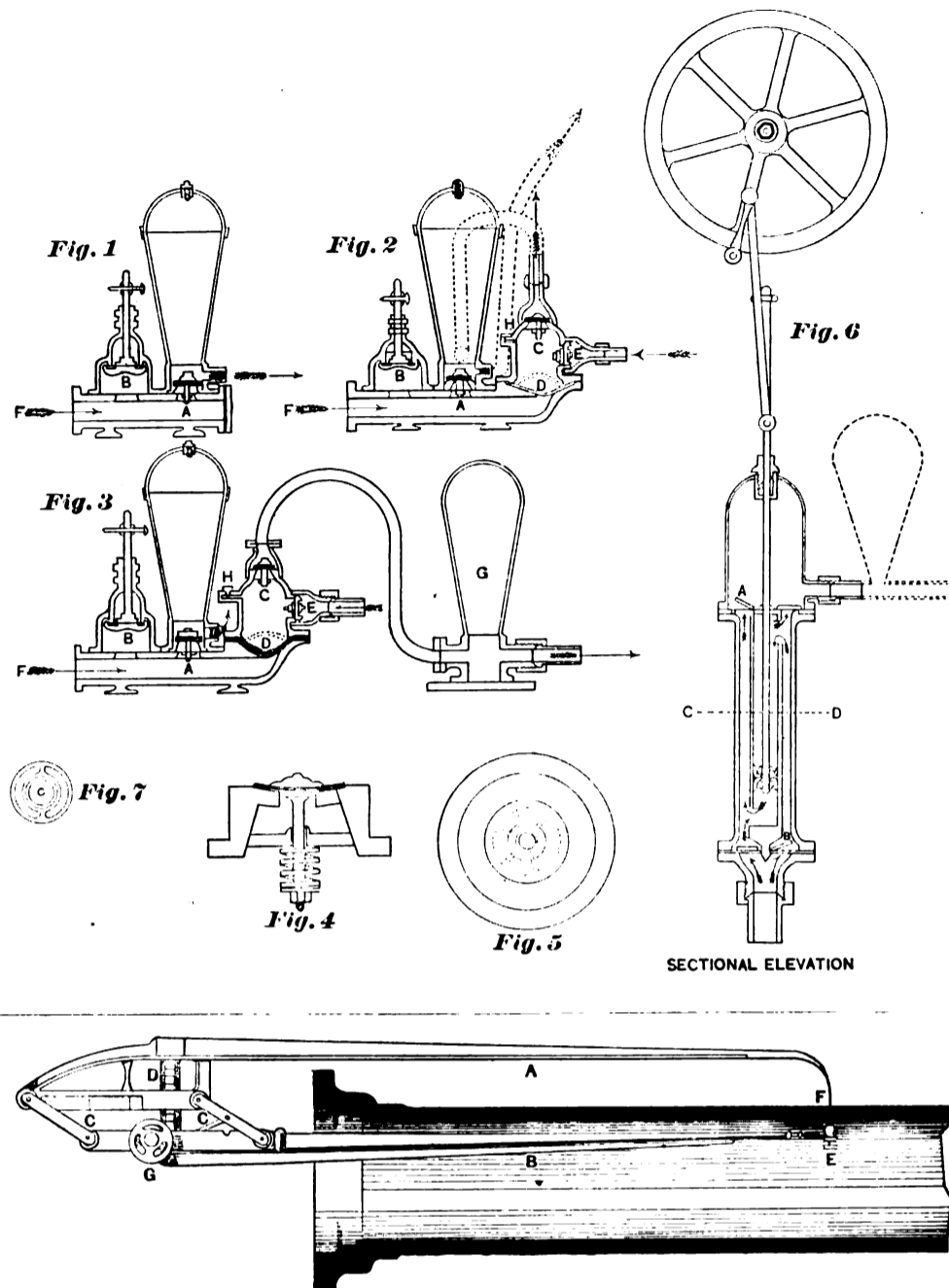


FIGURE 8.

The illustration (Fig. 6) represents a sectional elevation of a double-action pump, or one that raises water by the down-stroke of the bucket as well as the up-stroke. It can be worked by hand or a pulley can be attached, and it can then be driven by steam or other motive power.

It consists of two concentric barrels, with a division between them on opposite sides, as shown in cross section. The plunger, commonly called the bucket, has a double-cup leather, and works in the inner barrel. The pump is shown with the down-stroke nearly spent, and with one inlet and one outlet-port open. The dome at the top of the pump is a copper air-vessel, but if the water is being forced to any considerable height a supplementary chamber can be fixed, as shown by dotted lines.

SOUTH ANNEX.

Mr. A. T. Angell, of 144 Fulham Road, London, S. W. (stand No. 466), exhibits his well-known air-tight manhole cover, which can be locked, and also a drain-syphon with projecting lip to throw the water passing down the drain off the sides and directly into the centre of the body of water in the trap.

The East Central Gallery, which is an annex of the South Central Gallery, shows many bathing appliances, soaps, sponges, etc.

J. Tylor & Sons, of Newgate Street, London, E. C., (exhibit 928), have an extensive and creditable display of their various specialties. The committee of management objected to the exposure of water-closets in this gallery, and such being the case the exhibitors have their water-closets fitted up in inclosed rooms. Among the numerous appliances shown in this exhibit we noticed several lavatories for public institutions that were fitted by the action of a pedal, and instead of the ordinary plug and chain, were emptied by a valve on the same principle as the valve in a Bramah closet; the casings were made of slate and the

basins of zinc. A bath was also fitted up to be emptied in the same manner, the diameter of the waste-valve being three inches, emptying the bath in twenty-four seconds. In the same exhibit was a pair of calipers for gauging the thickness of cast-iron pipes, the invention of Mr. Scott. As will be seen by the diagram, Fig. 8, it is composed of two (nearly) parallel arms, A and B, which terminate at their outer extremities in the stationary hard steel point F and the adjustable steel point E. At their other extremity they are connected together with the parallel bars C C, in the manner of a mariner's parallel rule; the bars being tee-shaped in their section, with coned bearings at each end, fitting recesses in both sides of the arms, there being four of the pieces C, which are secured by taper-headed screws.

The section of the arm A is tee-shaped, and that of the arm B tubular, with a supporting-rib. Through the tubular arm is a rod, into the head of which the adjustable milled-headed screw E is fitted; the other extremity of the rod being connected by a rack with a pinion attached to the hand-wheel G, for the purpose of keeping the point E opposite to the point F when the calipers are opened. The hand-wheel G by the same operation opens or closes the calipers by being in connection with one pair of the parallel rods C. The scale D is divided at one edge into $\frac{1}{8}$ " and $\frac{1}{16}$ ", and on the other into $\frac{1}{10}$ " and $\frac{1}{20}$ ", the same being on the reverse side for greater convenience in reading.

This seems to have been adopted by various water-companies in England, and would seem to be a useful instrument for water boards and boards of public works to test the thickness of iron pipes supplied under contract.

In this exhibit is also Terry's pedal action as applied to a closet, the invention of Mr. S. H. Terry of the Local Government Board. Placing the foot on the pedal starts the flush and also drops the valve at the bottom of the water-closet basin to permit the discharge of the contents.

EASTERN ANNEX.

James Robertshaw, 3 and 5 Simpson Street, Manchester, Eng. (stand No. 517), exhibits some heavily-made steam and water valves. We annex a cut of the globe-valve, Fig. 9, to give our American readers some idea of the weight of metal used. Although really a globe-valve, yet from the amount of material, shape, and size, it looks like an American gate-valve. The exhibitor also shows a divided earth-closet for separating urine from the excreta, and the model of a tripod, holding a dish for burning sulphur for disinfecting purposes. This is so arranged as to move up and down, fixing with a screw at different elevations.

John Warner & Sons, Crescent Foundry, Cripplegate, London (stand No. 511), have an attractive display of all sorts of plumbers' material, closets, lavatories, pumps, and copper cooking-utensils. They exhibit a portable invalid's water-closet, in which there is an earthen pan, the bottom sealed with a balance-valve, and with a tin receptacle beneath. The lifting of a handle pumps a little water from a tin reservoir inside the casing.

A. Emanuel & Sons, 53, 55, and 57 Marylebone Lane, London (stand No. 509), dealers in all sorts of plumbers' materials, exhibit a great variety of brass and plated water-fittings, closets, pumps, etc.

CENTRAL GALLERY.

Doulton & Co., Lambeth, London, Eng. (exhibit No. 408), have a very extensive show of their various manufactures of Doulton-ware, plumbers' brass-work, earthen traps and soil-pipes, baths, closets, filters, etc. The prominent feature of the exhibit is a "pavilion," thirty feet in height to the centre of the dome. The shell is of wood, covered

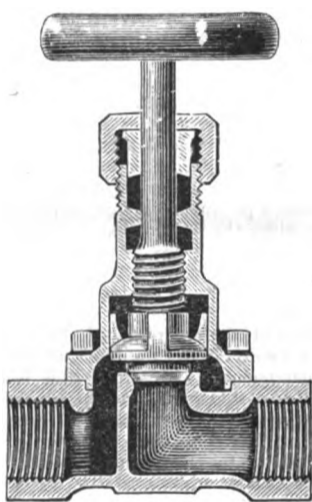


FIG. 9.—GLOBE-VALVE.

in "Doulton" tiles and panels, and with supporting columns of the same ware. On the outside the hand-painted tiles give illustrations of various incidents in the lives of potters and in the pottery world. Under the dome are four rooms variously fitted up, showing specimens of fire-places, vases, etc., in the special ware of Doulton & Co. Among the sanitary appliances are their flush-tanks, and other specialties well known to the readers of THE SANITARY ENGINEER.

In passing out of the Central Gallery to go to the Eastern Annex, we come into a vestibule, where are the exhibits of Cliff & Son, of Wortley, Leeds, Eng., and Wilcocks & Son, Burmantofts, Leeds. These exhibits will be interesting to householders as well as to members of the architectural profession, as they show the variety of form and color in which clay may be used for the house and home. Cliff & Son have a most extensive and interesting exhibit of ornamental and glazed bricks and tiles, baths, and chimney-pieces. They also exhibit an attractive assortment of their porcelain white-glazed sinks, and their "Imperial Porcelain Baths" and washing-tubs. The novelty seemed to be a sitz-bath made of the same material as the Imperial bath, and in the shape of what is ordinarily known in America as a copper-lined sitz-bath. Opposite Messrs. Cliff is the elaborate display of Wilcocks & Co., who show specimens of their Burmantofts' "Faience" in a very great variety of form and color, both for decoration and construction; garden vases, bricks, tiles, panels, chimney-pieces, and columns, in high and low relief. A tasty mode of wall decoration is shown in the shape of panels, the relief being produced by painting with a solution of colored clay on clay.

SOUTH ANNEX.

Henry James & Co., 9 Northumberland Street, London, Eng. (stand No. 479), exhibit specimens of glazed stone-

ware drain-pipes and other fittings. Also Pott's "Patent Edinburgh Air-Chambered Sewer and Soil-Pipe Trap." They further show good potteryware sinks, wash-out basins, and Truss' patent water-waste preventing valves for water-closets, urinals, etc., one of which is shown in application to a wash-basin. The valve is designed to deliver a fixed amount of water, and then to close. It is operated by a treadle action. While a person is washing he is obliged to stand on this treadle, and when he steps from it a waste-valve is lifted, and the basin empties. The device could be improved if the waste-valve were provided with an overflow-pipe, so that if the supply-valve got out of order there would be no risk of flooding the place.

Benjamin Finch & Co., 181 High Holborn, London, (stand No.), exhibit several forms of water-closets and lavatories. We also noticed a tip-up basin, in which the hot and cold water taps are placed on either side beneath the slab. Turning a four-spoke handle admits the water through the axle on which the basin is hung. A porcelain bath was supplied from the head, instead of the foot, as is usual, from a metal fan that lay between the wooden casing and just over the head of the bath, offering no projection to interfere with the bather.

Benham & Sons, of Wigmore Street, London (stands Nos.), have a novel and interesting display of metal baths and brass water-utensils, and the novelty in this exhibit was a brass wash-stand, in which the frame is made entirely of brass, tiles being set in the wall-plate, having an oblong slab and basin, with a brass-enameled slop-pail standing on a tiled shelf, to catch the waste-water from the basin above. On a lower tiled shelf was a brass-enameled water-pail. Directly behind this exhibit the same firm has a very extensive display of cooking apparatus for hotels and public institutions.

THE FRENCH EXHIBIT.

One of the best exhibits, both as to arrangement and as showing a just conception of what a health and educational exhibition should be, is that of France. It is true that an appropriation from the Government made possible what was quite impossible in the case of the United States. The Department of Public Instruction and of Commerce, the Observatory of Montsouris, and the city of Paris, together with various societies and individuals, combine to make the exhibit comprehensive and creditable.

A considerable part of the French exhibit is grouped in a building by itself—in the West Central Gallery. Here education is represented by a number of plans of schools, and by books and diagrams bearing on school architecture and school hygiene. We notice particularly the display of forgings, castings, turnings, and finished machines from the Ecole Nationale d'Arts et Metiers. Here the various societies of public medicine and hygiene are represented by collections of reports and by other publications.

The city of Paris, by diagrams and models, illustrates the systems of water-supply and sewerage there adopted. These, as well as other things in the French section, are not new, not prepared especially for this occasion, but are no less appropriate. M. Durand-Claye shows by plates and diagrams the results of his studies on the distribution of typhoid fever in Paris. The Observatory of Montsouris displays a collection of meteorological instruments, and especially the apparatus used for collecting and examining the floating dust of the atmosphere, on which so much time and study has been expended by M. Miquel. Also, aspirators for drawing small volumes of air through sterilized liquids, in order to detect and estimate the number of "germs" floating in the atmosphere of different localities.

THE SANITARY ENGINEER has frequently alluded to the results obtained in food examinations conducted in the Municipal Laboratory of the city of Paris (M. Charles Girard, Director). This laboratory exhibits apparatus and instruments of research used in the prosecution of the work of the laboratory, and shows a number of photographs and documents relating to the examination of foods and to the detection of adulteration therein.

M. Pasteur contributes various implements of research used in his laboratory in the etiological and prophylactic investigation of contagious diseases. To any one who has followed the work of Pasteur from the time of his controversy with Liebig as to the cause of fermentation, up to his most recent researches on rabies, this exhibit is of peculiar interest. Dating from the time of the controversy with Liebig, we see a sealed glass balloon containing a fermentable liquid, and everything necessary for fermentation except the living germ. In the absence of the necessary living organism, the liquid remains unchanged after the

lapse of so many years. Here we see diagrams and apparatus to illustrate Pasteur's researches on the production of vinegar and the preservation of wine and beer, by heating them to a definite temperature. Among the laboratory apparatus we have various sorts of ovens for maintaining constant temperatures and for sterilizing liquids and solid objects by the application of heat; unglazed porcelain tubes for sterilizing liquids by filtration, no germ being able to pass through the pores of this material; tubes of various forms and sizes for the cultivation of germs of different sorts in appropriate and previously sterilized fluids; instruments for withdrawing blood and pus from diseased animals and introducing it for cultivation into sterilized liquids; instruments for inoculating healthy animals with the material of disease directly, or after cultivation or dilution. Photographs and diagrams show the laboratory fittings, among them the cages in which the dogs are confined on which experiments are being made with reference to the nature, propagation, and prevention of madness; and photographs show also the micro-organisms, the so-called bacteria, which are the cause of chicken cholera, anthrax, and other diseases.

There are, as might be expected, a number of private exhibitors of articles of food and drink, of dress and of ornament, of filters, and, alas! of disinfectants. One of the most interesting among the private exhibits is that of Appert Frères, 24 Rue Godot de Mauroi, Paris, who show a process for blowing glass by means of compressed air instead of by air from the lungs of the workmen. Messrs. Wiesnegg, Rue Gay-Lussac, and Alvergnyat, Rue de la Sorbonne, have good displays of apparatus and implements for use in laboratories of chemistry and hygiene. Messrs. Richard Frères, 8 Impasse Fessart, exhibit various self-recording instruments, such as anemometers, barometers, pluviometers, thermometers, etc.

Messrs. Geueste & Herscher, 42 Rue du Chemin Vert, show models of an oven and bakery on their system, which is that adopted by the French army, of a furnace for disinfection by the alternate action of steam and of hot air, and models to illustrate the heating of buildings by steam. Some details of the exhibits in this section will probably be referred to later on.

On stand No. 485, The London Sanitary Protection Association, of No. 1 Adams Street, Adelphi, London, shows several small models of various makes of drain-fittings; also large diagrams illustrating good and bad ways of arranging the sanitary plumbing of a house. Several specimens of defective plumbers' work are also exhibited, and an old D-trap, with the dip-pipe eaten almost entirely away by corrosion. Another D-trap is shown which not only did duty for a water-closet, but also for a bath, a sink, a cistern, and the safe. Two of these pipes were branched into the trap above the water-line, so that any smells could freely pass through them.

SOUTH ANNEX.

On stand 501, the Imperial Stone Company (the Thames Silicated Stone-Works), East Greenwich, shows some very good specimens of concrete sewers three feet in diameter, scullery sinks made of concrete, and also a flush-tank made of the same material. A small cast-iron flush-tank is also shown with a tip-up bowl inside.

Mr. Ed. Gregson Banner, C. F. (Banner Bros. & Co.), 11 Billiter Square, London, E. C., shows on stand No. 502 various specimens of cowls for both up and down draughts for ventilating-drains. Also soil-pipe traps, grease-traps, cast-iron air-tight covers for manholes, and fat-traps, cess-pools, etc. The joints of these covers are made with sand instead of using India-rubber packing.

Messrs. Broad & Co., brickmakers, etc., 2 and 4 South Wharf, Paddington, on stands Nos. 503 and 504 show their improved inspection gulley and air-inlets for drains, "Field's" channel-syphon in vitrified stoneware, and their own reducing channel-syphon. Messrs. Broad & Co. being the sole London consignee for the goods manufactured by the Bourtreehill Coal Company, Dregthorn, Ayrshire, show specimens of enameled earthen sinks, baths, mangers, milk-coolers, drinking-water cisterns, slop-sinks, and wash-tubs.

Messrs. Crosthwaite, Paul's Wharf, Upper Thames Street, and 153 Queen Victoria Street, London, E. C., on stand No. 498 show specimens of iron goods, such as cast-iron sinks, mangers, and gulley-traps.

Messrs. Cliff & Sons, Wortley, Leeds, on stand No. 499 show good specimens of glazed stoneware pipes, traps, and horse-troughs.

Messrs. Candy & Co., 11 Queen Victoria Street, London, E. C., on stand No. 497 show good specimens of vitrified

stoneware. We noticed a new yard and gulley-trap, with movable silt-bucket, in vitrified stoneware, also the drain-pipes as having extra depth of sockets, the insides of the sockets and the outside of the spigot ends being left unglazed, thus allowing cement to adhere more firmly.

Mr. Donald Nicoll, 12 Buckingham Street, Charing Cross, stand No. 494.—Here are exhibited dust-bins with wire-baskets attached for separating ordinary waste materials from the ashes. Also a garbage-bin for containing house refuse of a decomposing nature, such as the entrails of fish, fowl, or game, etc. This bin also contains a sifter, which on being rapidly moved on the sliding-rods to which it is attached, distributes over each deposit of garbage a quantity of deodorizing substance. Another model is shown as a tank placed to receive sewage discharged from houses by the usual drain-pipes. One side of this tank is so constructed that the sewage may filter through a body of crushed flint, lime, and charcoal, and finally pass to the street sewer or drain, the solid matters being afterward carted away by night. Why so much trouble is taken to obstruct the flow of filth to the sewer, which should be utilized for its speedy removal, does not appear.

The models are shown in an imaginary street 'subway, with an opening so that they can be hoisted up to the level of the street or the removing vehicle, and this can be done without interfering with the comfort of the inmates of the house.

Mr. H. King, builder, High Street, Kensington, London, on stand 496 shows his system of constructing and ventilating house-drains. The arrangement of manhole and sewer-trap is good. The way in which the sink-waste discharges over the gulley grating, is such that very little water would find its way into the trap, unless a curb was put around it.

(TO BE CONTINUED.)

Correspondence.

THE SYPHONAGE AND VENTILATION OF TRAPS.

4 PEMBERTON SQUARE, BOSTON, August 9, 1884.

To the Editor of THE SANITARY ENGINEER:

In your criticism of this week on the Report to the Boston City Board of Health on the Syphonage and Evaporation of Traps, you have made a number of misstatements which do a great injustice to myself and others concerned, and I request you to make an immediate correction of them in your next issue.

In the second paragraph of your article you say that I made no mention of a patent of my own when I obtained the aid of the Board of Health for making the tests on traps. This is altogether untrue. I informed the Board of Health of my invention, and of my intention to patent it as soon as I knew of either myself, which was not until it had decided to make an appropriation for the tests to be made by me, but before any actual work had been begun on them. The first idea of my "Sanitas" trap, the subsequent development of the invention, and my application for a patent, all occurred during this interval. Had you applied to the only source whence you could possibly have obtained correct information on this point—namely, to myself or my patent lawyer—instead of going to outsiders, you could have avoided this error. No part of the money appropriated by the board was used for testing the "Sanitas" trap, as you imply. The tests on this trap, and two-thirds of the rest of the experiments, as well as the whole of the preparation and illustration of the report, were made at my own expense; the report was originally also published without expense to the board.

All the deductions on the "Sanitas" trap which have been written in the original manuscript were omitted in the printed report, because we considered it in better taste to do so. But we did not omit the short and impartial record of the actual tests, for two good reasons.

First.—Because after criticising an existing order of things, it is of primary importance to point out a *cure*, if one is to be had. Such a cure I believed I had discovered, and I therefore described it as being a matter of considerable public interest. It is easy to show the serious defects of the present trap-vent law, but difficult to supply an effective remedy. A trap which is both anti-syphonic and self-scouring is a thing of vast public value, since it saves the public from the very serious dangers and expense of special trap-ventilation. It is practically a solution of the problem which has given rise to all the careful researches and reports on trap-syphonage heretofore made. To omit all mention of such a trap simply because it happened to be a

patentable discovery of my own would be foolish false modesty.

Second.—In consideration of having myself defrayed so large a part of the expenses of these investigations, as well as of the publication of the report, it would have seemed quite justifiable to include a record of this trap with the others, even if it had been of no particular interest to any one except the owner. Nevertheless it was not forced upon the Board of Health, but the whole report was presented to it again after omitting the deductions on this trap, and the board was invited to criticise it before it was printed. It was returned without comment, and was therefore published as it stood.

You are also in error in your statements as to the manner in which the tests were intended to be conducted. It was originally intended to experiment on different sized pot-traps only, and no other kind of trap was had in mind by any of us. But afterward other kinds of traps were added at the request of the board. Messrs. Bowditch and Philbrick were both invited to participate at my original suggestion and request.

These investigations produced new and entirely unexpected results, and it was not surprising that Messrs. Bowditch and Philbrick should not be prepared to sign a report giving results so entirely opposed to their views on trap-ventilation. Mr. Rice was therefore invited to take their place, and after having carefully gone over the necessary tests, and revised and improved the report, he signed it as it now stands.

You say that "the apparatus used was not a fair type of ordinary good practice." So far as I can remember only three objections (which I considered unimportant) were raised to the form of the apparatus, and they were raised only after the apparatus had been completed and the principal tests made and recorded. It would have involved considerable expense to alter the apparatus, and this is the only reason why it was not done. One of these objections raised by Mr. Philbrick was that the 4"x4" Y-branches to which the waste-pipes carrying the traps to be tested was attached caused a much more powerful suction on the traps than a 4"x2" Y-branch would have done under the same circumstances, and that, therefore, the tests were much severer than was necessary.

The *second* objection was that a plunger water-closet discharging 4½ gallons at each usage produced a syphonic action of greater severity than need be counted on in practice, and that the use of such a closet should be prohibited if it involved the destruction of the seal of traps properly ventilated.

The *third*, and only other objection which I remember, was that the waste-pipe on which the traps were tested for evaporation was not long enough.

It was also suggested that the temperature of the outer air should be taken from time to time during the tests on evaporation. This suggestion I endeavored to carry out, but finding it made no appreciable difference in the results, the attempt to record the external temperature with accuracy was abandoned.

In regard to the first objection, I will only say that I differ entirely in opinion on this point. I hold that the use of the 4"x4" Y-branch did not in the least degree increase the syphonic action on the trap. I stated this at the time, giving my reasons therefor, but nevertheless offered to change the branches to demonstrate the point, provided the apparatus could in other respects be accepted as satisfactory. No sufficiently definite answer being given to justify the expense, the branches were not altered. The 4"x4" Y-branches were originally used because no 4"x2" branches could be conveniently obtained at the time.

Now, with all due modesty and deference to the opinions of others, I nevertheless assert that *had a 4"x2" Y-branch been used instead of the 4"x4" branch, a stronger, rather than a feebler, syphonic action would have been produced on the traps tested.*

The reasoning on this point urged in your article is unsound and unscientific, and this objection, which is your principal one to the apparatus used, falls to the ground. At another time and place I will give the grounds on which I base these assertions, and clearly demonstrate my position. In regard to the second point, that the value of the tests was impaired because a water-closet of unusual syphoning power was used, I also beg leave to differ in opinion; *first*, because the water-closet used is one which has obtained considerable popularity in this country, and *second*, because I find that with plunger closets discharging only three gallons (an amount of water which you yourself mention as sufficient, and which is known to be very com-

mon), essentially the same results are produced so far as concerns its power to break the seal of large pot and ventilated S-traps. Such a discharge will syphon out a 4-inch pot-trap in less than a dozen discharges while the bath-tub S-trap, ventilated with a smooth pipe the full size of the bore of the trap, and less than ten feet long. In regard to the *third* objection, that the waste-branch on which the traps were tested for evaporation was too short, I fail to see any reason whatever for this. The branch was five feet long, which was a length of very common occurrence in practice. The soil-pipe into which it discharged ran about sixty feet more before reaching the fresh-air inlet. Hence the air-current producing the evaporation traversed sixty feet of pipe. I claim that an extension of five or ten feet more, as suggested, would have made no appreciable difference in the results obtained. There are other serious errors in your review, but I will at present refer to but one more. You say that the tests for syphonage were made at a point some forty feet below the water-closet, producing the syphonic action. This is not the fact. The distance was only eleven feet, and it was so stated in the report.

J. PICKERING PUTNAM.

[The above was received too late for publication in our issue of last week or it would have appeared then. We gladly allow the use of our columns for the defense of any one who thinks himself injured by their contents.]

We have but one correction to make—viz.: We seem to have been in error in supposing that Mr. Putnam had patented his invention before applying to the Boston Board of Health for aid in making his tests. We took this for granted, and, as it turns out, without sufficient reason, and the same impression was received by others who found these various traps treated of all together in his experiments. We are glad of the opportunity to set this matter right, and we now disclaim any intention to disparage Mr. Putnam's character in any way, and regret exceedingly that it may have suffered unjustly from our error.

Mr. Putnam had, however, placed himself before the public as an expert, endeavoring to introduce an improvement in sanitary appliances and sanitary rules, in what appeared to us, and still so appears, a false light—viz., as a supposed *disinterested* investigator of such problems, in which the public has a deep interest, for however disinterested he may have been in the beginning, Mr. Putnam admits that he had a pecuniary interest when his report was made. Now, since the Boston Board of Health was represented as taking a part in this investigation, and since the report was addressed to it, it carried the prestige of a document prepared solely in the interest of the public.

We stated, and had the best of authority for the statement—viz., that of the chairman of the board—that this board was not aware of Mr. Putnam's possible bias when making the arrangement with him. This is confirmed by Mr. Putnam's own statement, that the reason for the supposed bias did not then exist at all. If it had, we have a right to suppose that some person better qualified would have been employed for the purpose.

We say this without wishing to cast the slightest imputation upon Mr. Putnam's honesty and sincerity, and say it because, taking human nature as we find it, we think the public has a right to demand that such investigations should be made by men having no pecuniary interest whatever in the results to be arrived at.

Other complaints brought by Mr. Putnam are founded on matters of opinion. His arguments do not convince us that we were in error, and we have therefore nothing further to retract or qualify.

In the last paragraph of Mr. Putnam's letter he claims that we made an error in describing the height through which the water fell from the point where it was liberated to the traps that were experimented on. We took this height from the figures on the diagram which appeared in connection with Mr. Putnam's report. If we misunderstood these figures it was an error which any one would be likely to fall into who looks at the diagram, and arose from no neglect on our part; nor do we consider the difference of much importance.

In this connection we notice that the *American Architect and Building News*, in its last issue, expresses indignation at our treatment of the case, and is evidently but poorly informed on the subject. We are complained of for not having "investigated both sides," when we were not aware that any controversy existed.

The *Architect* thinks "Mr. Philbrick and Mr. Bowditch made a mistake in withdrawing their assistance." The fact is, these two gentlemen were never employed in the case by any one. They consented, at the request of the Chairman of the Board of Health and Mr. Putnam, to be present at some experiments, merely as a personal favor to these gentlemen, having had no voice in the preparation of the apparatus. They soon found that this apparatus was, in their opinion, so defective that no value could be attached to the results, and they so reported to the Board of Health at once.

The *Architect* further states that the criticism made by these gentlemen concerning the defects in the apparatus is a "quibble," and "an old tale of disagreeing doctors." On the one side stand Philbrick and Bowditch and THE SANITARY ENGINEER, on the other Putnam and Waring. Whether a quibble or not, further experiments will doubtless show. But we doubt if Col. Waring, or any other sanitarian of good sense and experience, will advocate the construction of 4-inch branches in a soil-pipe, without extending them

NATURE OF LABOR AND DETAIL OF WORKS.	No. of Ele- men- tary Price.	Quantity.	Price.	Amount.	Expenses.	Profit.	Total.	No. of Price.
For work done by artificial light, either day or night, only the cost of the light will be taken into account							obser.	28
Materials: The settling prices for materials, for furnishing only, will be composed—1st. Cost of outlay; 2d. Profit of ten per cent.							obser.	29
Work per Square Meter—Surface of hard pan: Of 0.08 m. thickness, including transportation and ramming. Each centimeter of thickness add. or less							2.09	30
Trimming or Leveling off: Ordinary, with ram'g With hand-roller.....	1	0.50	0.69	0.349			0.05 0.35	32 33
Spreading and Smoothing Off: Earth, sand, gravel, or hard pan up to 0.05 m. thickness	1	h. 0.063	0.69	0.043			0.04	34
Picking Up or Excavating Earth: From 0.05 m. to 0.20 m. thickness.....	1	h. 0.20	0.69	0.138			0.14	35
Excavating Macadam Roadway: Up to 0.25 m. thickness.....	1	h. 2	0.69	1.38			1.38	36
Breaking up bitumen surface (5 sq. m. per hour), including ranging, but no transportation.....	1	h. 0.20	0.69	0.138			0.14	37
Work per Cubic Meter, Excavation, including leveling off, trimming up sides and bottom: In excavation or fill of over 0.20 thickness, 12.50 c. m. per day..	1	hours. 0.80	0.69	0.552			0.55	38
When the excavation is accessible to carts, there will only be allowed the throw into cart, for all parts where material can be removed by rollway of a maximum grade of 10 centimeters per metre.....							obser.	39
In ditch, trench or hole up to 2 m. width at bottom. Trenches, etc., over 2 m. width at bottom, will be paid as regular excavation.....							0.73 obser.	40 41
Extra for Excavation: In among bracing and timbers, ½ add. to above price. In water, without bracing or timbers, ½ " " " In " with " " " " " " ½ " " " In undermining or in small quantities among bracing and timbering..... 1 add. to above price..... In water, undermining or in small quantities, etc., 1½ add. These additions also apply to throws, loading and transporting in barrows..... <i>Note.</i> —The above prices apply to earth and materials forming the soil of Paris..... Excavations in clay, turf, whatever may be the hardness, also the throws of such materials will be paid ½ add. to paragraphs Nos. 36 to 46..... Loading up, hoisting, transporting in barrows or in carts, of clay, will be paid ¼ add.....							obser. obser. obser. obser. obser. obser. obser. obser. obser. obser.	42 43 44 45 46 47 48 49 50
In Rock, layers, old masonry, gypsum <i>Note.</i> —The add. from paragraphs Nos. 42 to 47 will only be allowed as ½ for this excavation.....							2.42 obser.	51 52
Casting: On bank, of earth excavated to 1.80 m. in depth..... On staging, by successive height of 1.80 m., including time for rigging up stagings..... That for all earth less than 1.80 in depth will be computed as having one throw on bank..... That between 1.80 and 3.60, will be computed as having one throw on bank and one on staging. For that between 3.60 and 4.80 in depth, will be computed as having one throw on bank and two on staging, and so on..... Horizontally up to 2 m. distant inclusively..... The piling up of earth due to throws of shovel, transportation in cart or barrow, etc., will not be allowed any addition.....							0.46 0.46 obser. obser. 0.28 obser.	53 54 55 56 57 58
Hoisting Earth, with necessary rigging: By hod, per stairs or ladder, for every 3 m. in height..... By drum and pail, for every 3 m. in height, including set-up of drum..... By rope and pail, for every 3 m. in height.....							1.38 0.69 1.38	59 60 61
Excavation of Wells, per cubic meter: In ordinary soil, that is not running, not sheathed, out of water, down to 30 meters depth, the drum being set-up over mouth of well without any scaffolding, the material dumped around well; no intermediate staging: Down to 10 m. depth..... From 10.01 to 20 m. depth..... From 20.01 to 30 m. depth..... In caving soil, that is not running, but sheathed every 2 m. or plastered over with lime and out of water, being in same conditions as above: Average price down to 30 m. depth..... In tolerably hard material, out of water, in place or out: Up to 60 m. height of strata..... In very hard material, or in more than 60 m. height of strata: Out of water, in place or out..... In clay: One-half add. to ordinary soil §§ 62, 63, 64..... In moving material, such as quicksands, and others that have to be sheathed as you advance: One-half add. to ordinary soil §§ 62, 63, 64.....							5.50 6.00 6.50 8.00 18.00 25.00 obser. obser.	62 63 64 65 66 67 68 69

NATURE OF LABOR AND DETAIL OF WORKS.		Total.	No. of Price.
In water; excavation of all kinds of materials, all the expense of pumping, charged separate:			
One-half add. to ordinary soil §§ 62, 63, 64.....	obser.	70	
<i>Note.</i> —Whenever in building wells for water or other purposes, the masonry is built as the excavation advances, the price of excavation will be computed $\frac{1}{2}$ add.....	obser.	71	
In infected or non-ventilated soil the expense of purifying or of ventilation will be paid separately and the price of labor fixed by special arrangement.....	obser.	72	
Loading (per cubic meter):			
In barrows.....		0.46	73
In carts.....		0.46	74
In hods or pails.....		0.60	75
The cost of loading includes the light picking necessary to rehandle the material.....	obser.	76	
Ramming (per cubic meter):			
Of earth in ditch, trench, or excavation.....		0.14	77
Rehandling Earth (per cubic meter):			
With throw for refilling, including light picking.....		0.35	78
Spreading or Smoothing (per cubic meter):			
Earth, sand, gravel or hard pan of more than 0.05 in thickness.....		0.23	79
Transporting (per c. m.):			
By barrows, for a run of 30 m. on a horizontal or down grade, and for a run of 30 m. for a rising grade over $\frac{1}{4}$;			
each run, including time for laying planks and necessary timbers for the railway.....		0.41	80
By hod as above, each run one-half add. to § 80.....		0.62	81
By cart, for a distance of 100 m. including lost time in waiting for loading and unloading.....		0.80	82
Each 100 m. add up to 500 m.....		0.19	83
Each 100 m. over 500 m.....		0.11	84
The above prices apply only to transportation by cart inside the limits of the works or outside, but in dumping-grounds named by the administration.....	obser.	85	
To public dumps at whatever distance, including all charges or dues for rights, exclusive of loading.....		4.25	86
To public dumps, including loading.....		4.60	87
All above prices apply to measurements in excavation and of material excavated, which swells one-quarter; consequently the price per cubic meter taken to the public dumps, including loading, measured in cart will be 4.69 fr. x 0.80, or.....		3.75	88
Above prices apply to removals in carts of at least 2 cubic meters capacity, which are obligatory for removal of earth from excavations.....	obser.	89	
In exceptional cases, where by special permit of the architect the capacity is inferior to 2 cubic meters, the price to be applied is that given in the series of Masonry and Paving—§ removal of rubbish.....	obser.	90	
N. B. —§ referred to gives price at 4.70, measured in cart, and all above x c. m. at the rate of 4.10. When a cart is not measured a 2-horse cart will be called 1 c. m., a 2-horse cart 1.5 c. m., and a 3-horse cart 2 c. m. If the rubbish alone is measured the average price of 4.40 per cub. m. will be applied. (Y. N. S.)			
All above settling prices are for work which have at least taken a whole day's labor.....	obser.	91	
For shorter time one extra hour will be added for displacement of laborer, unless the actual time of displacement has already been included.....	obser.	92	
But this extra will only be allowed if duly certified to.....	obser.	93	
For works not included in present series settlement will be made at the prices for same work included in series of other kinds of work, or if not to be found, then by comparison of price for analogous works.....	obser.	94	

Taken from the Pocket Edition.

[illegible]

NOTE.—The depth of excavation under paved street is measured from below the paving-stones. On non-paved streets it is measured from the under side of the road-surface (granite slabs, concrete for asphalt roads, broken stone for Macadam roads, etc.). The taking up and replacing surfaces other than paving will be paid separately.

In making out contracts for large works, where different classes of work are included, it is customary to reproduce in the contract that part of the Série concerning such work, with special items worked out. For instance, in Paris all sewer-work amounting to less than 40,000 francs comes

under the head of repairs, which are let out by contract for a series of years. The present contractor for this work dates his contract back from January 1, 1880, and lasts till December 31, 1885. As the work is ordered he sub-lets to other responsible parties acceptable to the administration. Appended to his contract is a list of all the prices on which his bid was made, including day labor, teaming, earth-work, paving, masonry, stone-cutting, framing and carpentering, iron-work, and painting. Also a table of prices of sewers per linear meter for all the regular types. Thus, for type No. 12, which is the most common, being 1.30 m. wide inside and 2.30 m. high, see the table immediately preceding.

This being all settled beforehand, when a certain street is to be sewered bids are called for, so many meters of such a type of sewer, work estimated at so much, the price per meter being that in the official list. The bids are sent in as discounts on such price. In wet ground all pumping is paid extra as per list for pumping. It would seem as if this would simplify matters a great deal. Every one is sure of bidding on the same basis, and the city is protected from all effects of collusion among bidders, etc.

Of course it would take some little time and labor to work up the *Série* or list, or at least the first one, but it would seem as if the cost of it would be amply repaid from the result of a few bids. Certainly for making out preparatory estimates for work it would be of great convenience, as the customary discounts would soon become known. Why would it not be as useful in this country as in the European States? Probably by this time there is a regular *Série* at Panama and along the route of the canal, for wherever there have been any French works going on—Suez, Cairo, Alexandria—there has been a *Série* established after a very short time.

Y. N. S.

Y. N. S.

LEAD ROOFING.

To the Editor of THE SANITARY ENGINEER :

DEAR SIR: I have a concrete roof, 90'x40', to cover with lead, on the top of which will be laid about two feet of earth, etc., to form a lawn. I propose to lay the lead upon a smooth surface of cement and to burn all the joints so it will be in one sheet of lead. Is this the best thing to do to make a good job and keep the room underneath perfectly drop-dry? What thickness of lead should be used for such a job, and how will it behave under these conditions? We shall be glad to have your opinion.

Yours respectfully,

JOHN W.

[When lead is to be laid on concrete it is important that all moisture should have evaporated out of the concrete, otherwise it will reduce the surface of the lead in contact to a carbonate. This does not take place when no moisture is present. If time and other circumstances will not allow for the concrete to become perfectly dry, a layer of tarred felt is an advantage, to keep the lead and lime from coming into contact. This felt would also prevent any sharp projections on the concrete from cutting the lead. If these precautions are taken 6-lb. or 7-lb. lead would do very well. Care should be taken that the earth to be used has no lime in it, as if so the lead would be injured by it. Two feet of earth would effectually protect the metal from the action of the sun's rays, in which case the pieces could be burned together, so that they would form only one sheet when in their position. The roof should be laid so that all or any water that may fall on it (that is from rain, etc.) may drain toward an outlet—in the first place so that unnecessary weight may not be thrown on the roof, and secondly to prevent the soil becoming so saturated as to kill all vegetation, or to become reduced to a swamp.]

PARIS SANITATION.—At the present rather grave conjuncture, a few facts respecting the sanitary arrangements of the French capital may prove of interest, as shown in an able work recently issued by M. Wazon. The total available daily supply of water is about 100,000,000 gallons, which, for a population of between 2,250,000 and 2,500,000, he considers quite inadequate. Between 1876 and 1881 the number of inhabitants rose from 1,988,000 to 2,240,000, at which rate of increase it will be probably 2,500,000 in 1886. The supply of water would then be about 40 gallons per head per diem. This is a higher proportion than Londoners obtain, but is far inferior to the supply of Marseilles, which enjoys 180 gallons a head per day. Although the cesspool system still exists in the city, the commissioners proposed in 1881 a temporary improvement in the use of metallic cesspools, containing from 60 feet to 200 feet cube, to be emptied by the pressure of the air; but the cost of emptying these weekly would be enormous, irrespective of the expense of providing and fixing a cesspool receptacle. The amount of household and street refuse per day in Paris is 2,000 cubic metres, or 54,000 cubic feet, which is removed by 600 carts. The rate for this expenditure varies from 1*d.* to 7*d.* per lineal yard of building frontage, and in 1880 produced £104,000, the whole cost of cleansing being £212,000. All houses in Paris are obliged to deliver the rain-water and household waste into the sewers, the municipality providing that every street less than 60 feet wide must have one sewer, and that streets over that width must have one sewer on each side of the way.—*London Times.*

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING AUGUST 9, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.							Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.							
NORTH ATLANTIC CITIES.																										
Portland, Maine	35,000	24	35.7	13	54.1					10					1											
Boston, Mass.	435,000	207	24.7	99	47.8	6		28.3		54	3		5		1	4	1	4	1							13
Lowell, Mass.	71,500	33	24.0	16	48.4	1	1	3	1	10					1		2									
Worcester, Mass.	69,000	32	24.1	9	28.1	2		2		7	1					1							1			
Fall River, Mass.	67,000	37	28.7	28	75.6					10						1		1				2				
New Haven, Conn.	69,500	30	22.4	14	46.6		1	3		7			2			1										3
Providence, R. I.	125,000	66	27.5	37	56.0			3		25				2		2		2								
Total	872,000	429	25.6	216	50.3	9	2	43	1	119	4	1	7	2	3	9	3	7	1	2	1	1	1	1	1	16
EASTERN CITIES.																										
Albany, New York	103,000	33	16.6	16	48.4	1		4		4			1			2		1								
New York, New York	1,355,000	708	27.2	396	55.9	16	3	86	16	153	12		9	10	7	29		19		19		6				13
Brooklyn, New York	670,000	326	25.3	161	55.5	7		33	4	83	5	1	1	6		11	1	3	2	1		5				11
Hudson County, New Jersey	225,000	98	22.6	47	47.9	1	4	16		17	3					3		1				2				
Newark, New Jersey	154,000	86	29.0	39	45.3	2	2	8		18	1				1	1		2				1				1
Philadelphia, Pa.	940,000	388	21.5	182	46.0	17	1	41	3	75	4	3	14		1	17	3	3				1				2
Wilmington, Delaware	50,000	26	27.0	9	34.6	1	2	4		3			2			2						1				
Total	3,497,000	1,665	24.8	870	52.2	51	12	192	23	351	25	4	29	16	9	63	4	29	2	20	16	1	1	1	1	27
LAKE CITIES.																										
Buffalo, New York																										
Rochester, New York																										
Cleveland, Ohio	210,000	97	24.0	65	67.0	2		5		37	2		1			2		1			4	2				
Detroit, Michigan	140,000	89	33.1	60	67.4			3		25	3					5	1	4				1				
Chicago, Illinois																										
Milwaukee, Wisconsin	147,000	89	31.5	68	76.4	1	2	2		32	1		1			2	1				2	1				
Total	497,000	275	28.8	193	70.1	3	2	10		94	6		3		2	9	2	5		6	4					
RIVER CITIES.																										
Pittsburg, Pa.	210,000	84	30.8	50	59.5	3		6		19	9	1	3	1		3					3	1				3
Cincinnati, Ohio	275,600	91	17.2	29	31.8	2		15		14	3		5	1		4	1	1				1				
Louisville, Ky.	137,000	62	23.5	21	33.6	2	4	7					2			2					2					
Indianapolis, Ind.	94,000	24	18.3	13	54.1			2					1													
Minneapolis, Minn.	100,000	53	27.6	38	71.6	2	1			24	4					1		1			2	1				
Evansville, Ind.	34,000	18	27.5	7	38.8	1		3		1					1											1
Kansas City, Mo.	75,000	23	15.9	9	30.1					5			3		1	1	1	1				1				1
St. Louis, Mo.	375,000	168	28.3	72	42.8	9		15		33	5	1	2	10	2	7	4	1			2					1
Total	1,300,600	523	30.0	239	45.6	19	5	48		96	21	2	16	13	3	18	7	3		9	4				6	
SOUTHERN CITIES.																										
District of Columbia	Wh. 133,800	49	19.0	20	40.8	2		8		8	1		2		1	1	2	1								2
Richmond, Va.	Wh. 60,300	48	36.0	25	52.0	2		4		9		1				1	2	1				1				
Charleston, S. C.	Wh. 41,000	28	35.5	8	28.5	1		3		3			3			1										
Atlanta, Geo.	Wh. 32,400	28	45.0	14	50.0			2		4			3			1										
Augusta, Geo.	Wh. 25,000	9	18.7	2	22.2			2		1			1													
Savannah, Geo.	Wh. 27,800	25	46.8	10	40.0	1		2		9						2										
Nashville, Tenn.	Wh. 20,000	5	13.0			1		1																		
New Orleans, La.	Wh. 15,000	10	34.7	8	80.0					4						1										
Memphis, Tenn.	Wh. 24,000	3	6.5							1																
St. Louis, Mo.	Wh. 17,000	10	30.6	5	50.0			1		1																
St. Louis, Mo.	Wh. 35,100	9	13.3	5	55.5			2		3																
St. Louis, Mo.	Wh. 21,300	6	14.6	3	50.0					1																
St. Louis, Mo.	Wh. 171,000	61	18.5	17	27.8	6	2	8		7	2		1	3		1		1								1
St. Louis, Mo.	Wh. 63,000	35	28.9	12	34.2	1		10		5						2										1
Total White	449,900	164	18.9	53	32.3	10	2	24		23	3		7	7	1	2	1	1		23	4				4	
Total Colored	245,800	102	34.3	77	47.5	4	1	20		33	1		3	2		5	2	1		1	1				1	
Total in 32 U. S. Cities	6,862,300	3,218	24.4	1,648	51.2	96	24	337	24	718	59	7	65	40	18	106	19	46	3	37	26				54	
July 26.	Total in 28 English Cities	8,762,354	4,176	24.5		130				881	30		33		77											118
" 26.	" 8 Scottish Cities	1,254,607	563	23.8		17				43	5		3		6											22
" 26.	" 16 Irish Cities	858,660	314	19.0		5				12			4		10											10
" 26.	" 139 German Cities																									
" 26.	" 15 Swiss Cities																									
" 26.	" 15 Swiss Cities																									

Notes and Abstracts.

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The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending August 9, 1884, in 32 cities of the United States, having an aggregate population of 6,862,300, there died 3,218 persons, which is equivalent to an annual death-rate of 24.4 per 1,000. The rate in the North Atlantic cities was 25.6 per 1,000; in the Eastern cities, 24.8; in the Lake cities, 28.8; in the River cities, 30.0, and in the Southern cities, for the whites 18.9, and for the colored 34.3 per 1,000. Of the decedents over one-half, or 51.2 per cent., were under 5 years of age.

Accidents caused 2.9, consumption 10.4, diarrhoeal diseases 22.3, and diphtheria 1.8 per cent. of all deaths. The percentage from diarrhoeal diseases was highest in the Lake cities, 34.1, and lowest among the whites in the Southern cities—viz., 13.9. Typhoid fever caused 2.0, malarial fever 1.2, scarlet fever 0.5, pneumonia 3.2, bronchitis 1.4, measles 1.4, and whooping-cough 1.6 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 15 new cases of diphtheria, 53 of scarlet fever, and 16 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 23 new cases of diphtheria and 12 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 5 cases of diphtheria and 31 of scarlet fever under treatment August 9.

BALTIMORE, MD.—The weekly report of the Health Officer records 134 deaths, of which 62, or 46.2 per cent., were under 5 years of age. The annual death-rate per 1,000 was 17.03, or 15.79 for the whites and 24.26 for the colored. Diphtheria caused 1 death, whooping-cough 6, typhoid fever 5, malarial fever 3, diarrhoeal diseases 24, consumption 14, acute lung diseases

Rheims.—July 20-26. Deaths, 72; annual death-rate, 39.9 per 1,000. Diphtheria caused 2 deaths, typhoid fever 1, consumption 4, and diarrhoeal diseases 43.

BELGIUM—Brussels.—July 13-19: deaths, 224; annual death-rate, 27.1 per 1,000. Small-pox caused 6 deaths, measles 1, scarlet fever 1, typhoid fever 4, diphtheria 4, whooping-cough 1, diarrhoeal diseases 41, consumption 18, and violence 9.

RUSSIA—St. Petersburg.—July 6-12: Deaths, 549; annual death-rate, 37.6 per 1,000. Small-pox caused 4 deaths, measles 17, scarlet fever 21, typhoid fever 2, diphtheria 16, whooping-cough 7, diarrhoeal diseases 139, and acute lung diseases 73.

DENMARK—Copenhagen.—July 16-22: Deaths, 116; annual death-rate, 21.6 per 1,000. Measles caused 1 death, whooping-cough 2, diarrhoeal diseases 19, consumption 17, and violence 7.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Aug. 16.....	25.25	18.39	23.26	28.56	28.26	17.99

E. G. LOVE, Ph.D., *Gas Examiner.*

THE twenty-third meeting of the North British Association of Gas Managers was held in Glasgow recently. It was resolved that a memorial should be erected in Glasgow to Murdoch, the discoverer of the uses of gas. Mr. F. T. Linton, engineer, Edinburgh and Leith, delivered his inaugural address as president, his subject being the recent improvements in gas manufacture. The report of a sub-committee on regenerative furnaces for retort-settings was submitted, and several technical papers were read and discussed. In the evening the members of the association dined together.

THE PHILADELPHIA ELECTRICAL EXHIBITION.—Preparations are in a forward state for the approaching Electrical Exhibition at Philadelphia. The building itself is almost complete, and foundations are now being laid for the five engines which are to propel the machinery during the exposition. The largest of these engines will be 300-horse power, with a capacity of 180 revolutions a minute. All of the engines are of the Porter and Allen patent, and have a combined power of about 600 horses. The electrical fountain, which is to occupy the centre of the hall, is partially finished. A very interesting feature of the exhibition will be the Edison 30-ton dynamo-machine. This dynamo will be sufficient to supply most of the light for the building if necessary. The foundations for this lighting-machine are now being prepared, and will be completed in a few days. Among the curious things which will be on exhibition during the exposition will be the original Morse telegraph instrument, upon which the first electrical message ever telegraphed over a wire was sent from Washington to Baltimore. As a comparison to the simple key with which Professor Morse sent his first message there will be placed side by side with it a synchronous multiplex telegraphic-machine, by which an operator can send 72 messages at once over one wire. There will also be an electric chicken-hatching machine. The number of electric curiosities will be very great.

THE Equitable Gas-Light Company has issued \$1,000,000 worth of six per cent. bonds to raise money with which to complete its works and extend its pipes.

THE Adrian, Mich., Gas-Light Company will expend \$17,000 in the purchase of new machinery.

THE Brush Electric-Light Company has hit upon a novel plan to evade the injunction to restrain the city of Detroit from carrying out the contract to light the city with electricity. Since the expiration of the contract with the gas companies, the city has been making contracts from day to day. Now that the Brush Company has completed its towers in one section of the city, it petitions the Common Council to instruct the Comptroller to contract with it from day to day to light the city, instead of the gas companies. The Common Council promptly gave the Comptroller the necessary instructions.

Notes.

CONSTRUCTION.

WORK has been begun on the new building for the Young Men's Christian Association at Nos. 222 and 224 Bowery, New York City. The contract for the plumbing-work has been awarded to Mr. John Renahan, 163 East Thirty-fifth Street, for \$3,511.65, and that for steam-heating to E. E. Gold & Co., 15 Vandewater Street, the amount being \$2,960. The work is to be done under the supervision of F. N. Owen.

NORTHVILLE, MICH., will be provided with water-works.

BOSTON.—Twenty-three sets of plans for the new Public Library have been submitted to the City Architect. They are now before a special committee.

WE last week printed the name and amount of the successful bidder for work on the Boston Farm conduit. The following is a synopsis of the bids as opened on the 4th inst.: George M. Cushing, New York City, \$68,459.80; Benjamin Heath, Jr., Boston, \$71,356.50; E. F. Brigham, Boston, \$74,142; Seth Perkins and John M. Galvin, Boston, \$74,913.80; Parker & Sylvester, Rockport and Newton, \$87,308.20; J. H. Leavitt, Boston, \$89,852.50; Boynton Brothers, Boston, \$98,730; George H. Cavanaugh, Boston, \$100,040; C. J. Carmody & Co., Boston, \$102,817; John J. Leighton, Boston, \$127,279.30. The contract was, as before stated, awarded to George M. Cushing, of New York, the lowest bidder.

PHILADELPHIA.—The Public Building Commission has awarded the contract for the putting in place of a course of bond stone in the clock-tower to William Struthers & Sons, for \$2,415.60, and William Douglass was awarded the supplying of the stone for \$5,911, and the commission agreed to ask council to appropriate \$1,384,270 for the continuance of the work on the building during 1885.

A movement is now on foot to widen Chestnut Street, from Twenty-second Street to the Schuylkill River, and also to raise the grade. An ordinance was passed by councils providing for a resurvey and revision of the plans for the old city. This ordinance gives the authority to the Board of Surveyors the legal right to make the desired alterations.

A large fire which destroyed an amount of property along the line of Chestnut Street from Twenty-second Street to the river reopened the proposition, and a special meeting of the board was called to consider the alteration, when the surveyor of the district was ordered to prepare a plan of the properties affected by the proposed change, and the chief was instructed to report to council the advisability of the change.

The Mayor and Councils Committee on Police have been visiting the station-houses of the city for the purpose of inspecting the sanitary arrangements in the different station-houses.

THE contract for the construction of an iron bridge over the Salem Creek has been awarded by the Salem County Board of Freeholders, New Jersey to the Cleveland Bridge Company of Cleveland, Ohio, for \$21,000.

GOVERNMENT WORK.

POST-OFFICE AND COURT-HOUSE, BALTIMORE, MD.—Synopsis of bids for labor and materials to complete the walls of the superstructure, advertisement of July 8, 1884, opened August 13, 1884: M. A. McGowan, \$108,383 (if lime of tiel partitions are allowed, \$108,000); hollow-brick partitions; Gill & McMahon, \$108,235.

COURT-HOUSE AND POST-OFFICE, JACKSON, MISS.—Synopsis of bids for plumbing and gas-fitting materials, advertisement of August 1, 1884, opened August 15, 1884: H. H. Bruser, \$1,060.30, 60 per cent. off for fittings; Marmion & Co., \$1,119.69, 15 cents per pound for fittings.

COURT-HOUSE AND POST-OFFICE, FRANKFORT, KY.—Synopsis of bids for iron columns, beams, etc., advertisement of July 26, 1884, opened August 15, 1884: McHose & Lyon, \$925.00, no check with bid; L. M. Morris, \$1,024.06; Phoenix Iron Co., \$1,750.00; Thomas H. Brooks, \$800.00; Mead & Co. Iron Works, \$850; Cleveland Bridge & Iron Co., \$1,725.35; J. T. Walton & Co., \$759.00; Heuvelman & Co., \$1,238.00, no check with bid.

SYNOPSIS of bids opened August 13, 1884, for extra story on building at Syracuse, N. Y.: Brick-work, John Moore & Co., \$23,000.00, including extra story; Dickson & Merrick,

\$6,750 for extra story. Stone-work, John Moore & Co., \$6,000, limestone; Hughes Brothers, \$5,530, limestone; \$10,000, brownstone; W. Crabtree, \$12,950, limestone.

THE following contracts for laying sewers in the District of Columbia, of which we published a synopsis of the bids on the 14th, were awarded: To John Cox & Co., 1,518 lineal feet 3.75' x 5.62', brick sewer, at \$6.61 per lineal foot; to James McCauldich, 100 basins at \$59.20 each, 1,500 12-inch trap-connections at 94 cents per lineal foot, 500 15-inch trap connections at \$1.09; to Thomas McCann, for brick sewers, 2,200 feet of 2'x3' brick sewer at \$3.50 per lineal foot, 4,210 feet of 2.25'x3.37' at \$3.75; 675 feet of 2.50'x3.75' at \$3.80, 2,925 feet of 2.75'x4.13' at \$3.90, 50 feet of 4.25' at \$7.50, 3,500 feet of 6.5'x9.75', brick and concrete, at prices aggregating \$43,793, 2,925 feet of 10.5' x 15.75', aggregating \$59,500; 2,000 feet of 20-inch brick and concrete, \$146,364; to Michael Shea, 2,415 feet of 3.25'x4.87' brick sewer at \$4.75 per lineal foot; to George Courtney, 2,520 feet of 3'x4.5' brick sewer at \$4.50 per foot. The contract shows that the total contemplated expenditure to be \$347,625.30.

BOOKS RECEIVED.

PROCEEDINGS, ADDRESSES, AND DISCUSSIONS OF THE THIRD SEMI-ANNUAL MEETING OF THE KENTUCKY STATE SANITARY COUNCIL. Held at Bardstown, Ky., March 26-27, 1884, under the auspices of the State Board of Health.

EXTRACT FROM THE ANNUAL REPORT (1882) OF THE MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD. With Report on the Sanitary Aspects of Emigration and Immigration from and into the United Kingdom. By F. H. Blaxall, M. D.

CHOLERA. Reprints from reports of the Medical Department, for the years 1865, 1866, and 1873, to the Privy Council and Local Government Board.

PROCEEDINGS OF THE NAVAL MEDICAL SOCIETY. No. 1, Vol. 2.

FIFTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF ILLINOIS. For the year 1882.

EXCERPT MINUTES OF PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS. Vol. LXXVII. Session 1883-84. Part III.: Wire-Gun Construction, by James Atkinson Longridge; The Composition of Coal, by William Foster, M. A. (Camb.); F. C. S.; Hydraulic Propulsion, by Sydney Walker Barnaby.

INTERIM REPORT ON THE RELATIONS OF SEPTIC TO PATHOGENIC ORGANISMS. To the Local Government Board. By E. Klein, M. D., F. R. S.

SPECIAL REPORT OF THE DIRECTORS OF THE IMPROVED INDUSTRIAL DWELLINGS COMPANY, Limited, upon the work accomplished during twenty-one years. July, 1884.

THE DURATION OF THE LATENT PERIOD, THE FEVER, AND THE EXANTHEMATA AND SOME ALLIED DISEASE. A paper read before the North-Western Association of Medical Officers of Health, at the Town Hall, Warrington, on February 14, 1884. By Francis Vacher, Medical Officer of Health for Birkenhead. London: John Heywood.

REPORT OF THE PROCEEDINGS OF THE TENNESSEE STATE BOARD OF HEALTH. Quarterly meeting. Nashville, July 1, 1884.

TRICHINE AUD TRICHINOSE AUX ÉTATS-UNIS. Par le Dr. Prosper De Pietra Santa, Secrétaire Général de la Société Française d'Hygiène. Paris: Au Bureau de la Société, 1884.

REPORT OF THE HEALTH OF LIVERPOOL, during the year 1883, with map showing the localities of the fatal prevalence of fever. By J. Stopford Taylor, M. D., Medical Officer of Health for the City and Port.

DR. F. W. BADNY'S REPORT TO THE LOCAL GOVERNMENT BOARD ON THE GENERAL SANITARY CONDITION OF THE BOROUGH OF GATESHEAD, with special reference to the prevalence of Infectious Diseases in the District. 1884.

PUBLIC HEALTH PAPERS AND REPORTS. Volume IX. Presented at the Eleventh Annual Meeting of the American Public Health Association, Detroit, Mich., November 13-15, 1883. With an abstract of the Record of Proceeding.

SECOND ANNUAL REPORT OF THE PROVINCIAL BOARD OF HEALTH OF ONTARIO. 1884.

FOURTEENTH ANNUAL REPORT OF THE TRUSTEES OF THE COLUMBUS WATER-WORKS. For the year ending March 31, 1884. Samuel P. Axtell, Secretary.

SEVENTEENTH ANNUAL REPORT OF THE HEALTH DEPARTMENT OF CINCINNATI. For the year ending December 31, 1883. C. W. Rowland, Health Officer.

SECOND ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF INDIANA. For the year ending October 31, 1883.

REPORT OF THE PROCEEDINGS OF THE FOURTH ANNUAL MEETING OF THE AMERICAN WATER-WORKS ASSOCIATION. Cincinnati, O., April 15, 16, 17, 1884.

Association News.

THE HAMILTON (ONTARIO) JOURNEYMEN PLUMBERS AND STEAM-FITTERS held a picnic and games on August 16.

ON Saturday, July 26, the employees of Messrs. Dent & Hellyer, of 21 Newcastle Street, Strand, London, held their annual dinner at the Crown Hotel, Broxbourne. The morning was spent in boating, cricketing, etc. They afterward sat down to a first-class dinner, after which the usual toasts were drunk, but none with more enthusiasm than that of the chairman, Mr. Dent. Among the visitors were three or four master plumbers, who a few years ago worked as journeymen for the firm, and who think it a great pleasure to have a day out with their old shopmates. The utmost good feeling prevailed throughout, and the party returned to town by a late train on thoroughly good terms with every one and everything, excepting the weather, which succeeded in dampening their clothes but not their spirits.

PHILADELPHIA MASTER PLUMBERS.—A largely attended special meeting of the Master Plumbers' Association was held August 7, 1884, for the purpose of considering the report of the Board of Directors of the Trade-School, in connection with the association. Mr. J. J. Weaver, the President, was in the chair, and the Secretary read the report of the Board of Directors, which was accepted and adopted. Another motion, that a new board be elected to serve during the ensuing year, was laid on the table, and the report was referred back to the board with orders to print, after making such modifications as in their judgment may seem necessary. The meeting then adjourned.

The regular monthly meeting of the Master Plumbers' Association of Philadelphia was held August 14, 1884, in its hall, 141 North Seventh Street, Mr. J. J. Weaver presiding. The minutes of the last regular meeting and of the special meeting were read and approved. The Executive Committee, which was directed some time since to enter into negotiations with the manufacturers and dealers of plumbers' material in the city, and arrange the matter of discrimination to the trade, and the scale of prices, etc., on a plan which would prove beneficial and fair to those regularly engaged in the trade, reported that it had held a meeting with the manufacturers and dealers, and that favorable progress had been made. The committee which had been appointed to request the Chief Engineer of the Water Department to provide better facilities for granting plumbers' permits, reported that it had called on the Chief, and he informed it that he had done all that is in his power at present, but he was anxious to aid the plumbers all he could to save time. The Treasurer presented his report, and it was referred, after which the chair appointed the five committees to canvass the city, and to induce all the plumbers in the city who are not members of the association to become members. Two new members were elected, and two new candidates proposed. Mr. Johnson moved that the plumbers of adjoining territory who have no regular association be requested to join the association, after which the meeting adjourned.

THE PHILADELPHIA PLUMBERS AND DEALERS.—A conference of the manufacturers and dealers in plumbers' materials of the city and the Executive Committee of the Master Plumbers' Association, was held recently in that city. The cause of the meeting was to see if some arrangement could not be effected whereby the manufacturers and dealers of the city would not sell material to persons outside of the trade at the same rate they sell to those in the trade. At this meeting three-fourths of the manufacturing and dealing trade of the city was represented, and they seemed to want to do what was fair to the trade and to themselves. A pleasant conference was held, and the meeting adjourned. The manufacturers and dealers are shortly to hold a meeting, when their decision will be communicated to the Master Plumbers' Association.

NEW YORK PLUMBERS AND DEALERS.—President Andrew Young, of the National Association of Master Plumbers, visited New York last week, for the purpose of endeavoring to effect an agreement in behalf of the association with the New York dealers, in consequence of which a conference between representatives of the New York and Brooklyn plumbers' associations and manufacturers and dealers was held at the United States Hotel on the 14th inst., and after some discussion on a proposition that the dealers agree to sell to no plumber not a member of the association in good standing, the meeting adjourned to the 21st inst., no action being taken.

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PUBLIC AND PRIVATE RIGHTS.

WHEN an individual delays the progress of any work which it seems necessary to complete speedily to accommodate a public demand, he is apt to be looked upon as a nuisance, and is sure to be reviled by the promoters of the delayed enterprise, by the public which is suffering, or thinks it is, and by the inconsiderate portion of the public press. And, indeed, it is difficult at the time to look upon the litigious party, who insists on applying for mandamuses, injunctions, and writs of *certiorari*, and in making appeal after appeal to higher tribunals every time he is defeated, with any other feeling than that he is, if not useless, certainly of doubtful utility. And yet when the matter is calmly considered this obstructor is, after all, a public benefactor. He is the means by which the just equilibrium is established between the rights of the individual and the power of the public, or, more properly speaking, by which the principles underlying that equilibrium are investigated and formulated in judicial decisions. The principles of equity are fundamental, but it has taken centuries of research and reasoning to determine them so far as they have been determined, and still with every new combination of circumstances produced by the changes in modes of living consequent on the advances of science as applied to practical life, new questions arise and must be answered.

There is nothing like a large city for bringing forward such questions and producing abundant business for the ablest legal and judicial minds. The controversies over the respective rights of the individual, the aggregation of individuals in the village or town, the combination of villages in the city, the corporations deriving their power from the city, and these deriving their power from the State or nation, have filled thousands of pages and occupied many years in every large city. The Parliamentary "Blue Books" relating to such matters in London form an immense library in themselves, and the literature of New York litigation is something enormous.

The rapid progress made of late years in means of intercourse and general intercommunication of comforts and conveniences has caused many before unthought of encroachments on what have been considered private and exclusive rights in both town and country, and a most interesting series of problems have been presented for solution. It is becoming necessary to define the exact limits of the power of the public to incommode or injure the individual without compensating him. When a railroad, for instance, passes through a thinly-settled territory, the shrieking of the steam-whistle when a train approaches an occasional road-crossing at grade is not likely to seriously disturb any one. But when frequent trains pass at high speed through the midst of a thickly-inhabited region, the constant scream of the whistle produces a serious annoyance and injury to a great number of individuals. It would seem as if such a case as this admitted of no argument, yet there is a railroad passing through the city of New York for several miles, the residents along the route of which are subjected to this outrage without being able to obtain relief. The man with pluck and means sufficient to enable him to fight the case out to its end has not come forward yet.

The demand for rapid transit from one end of the city to the other was the occasion for granting privileges to a corporation to occupy streets belonging to the public, on the plea that the expense of purchase of the right of way would prove so expensive as to defeat the enterprise. Some individuals who claimed to have been injured without compensation have persistently followed up their claims, and it is likely that the result will be a clear exposition by the courts of final resort of the exact rights which an abutter on a public street has to the use of that street. Recent decisions are to the effect that certain individual rights are retained in a street, and that compensation to the individual abutter is necessary, even when the permission of the public authorities has been obtained for occupation of the street for railroads, telegraphs, or any purposes other than simple traffic. It is not unlikely that before long the annoyance and injury created by the noise and dirt inseparable from the use of steam made on the trains will become so unbearable that the companies operating railroads in cities will be compelled to use some other motive-power.

It is a poor rule that won't work both ways, and it is a pity that some person with a taste for litigation does not press to a decision the question of occupancy of the public street by high steps and miscellaneous merchandise for individual benefit but to the public inconvenience.

Another litigant has recently been a public benefactor by bringing about a decision of the Court of Appeals that the city of New York and the United States may purchase land along the Harlem River and canalize it from the Hudson River to Long Island Sound for the benefit of the public, so that this great improvement is likely to be speedily accomplished.

Still another litigant is pushing to a decision in the same court the question whether a corporation can hold a franchise for bridging the Harlem River for thirty years without an effort to exercise it, and can then prevent a bridge being built by other parties in accordance with other laws.

Other litigants have been instrumental in affirming the right of the public to secure proper drainage in the upper part of the city, and others near New York are engaged in bringing to a settlement the rights of the public to enforce sanitary regulations, and compel the building of sewers and connecting with them.

Whichever way the decision in such cases turns, the plucky litigant must be looked upon as a public benefactor. If a law is good it ought to be enforced, and if it is defective it ought to be amended. The only way to discover defects is to subject the whole matter to legal analysis and judicial decision. There are several points requiring determination yet, and it is to be hoped that some one will soon rise up to contest the right of a municipality to acquire and hold land outside of its own boundaries for purposes of public amusement only, as pleasure-grounds, or for the public benefit by disposal of sewage and refuse. It will not be long before a great many incorporated towns will be compelled to acquire sewage-disposal grounds outside of their own limits, and pay for them, instead of throwing their wastes into streams to damage the riparian owners without compensation. The sooner the rights of all parties in such cases are defined the better will it be for all.

CIVIL SERVICE REFORM.

If the laws regulating the admission of persons to employment in public offices are honestly and judiciously carried out the benefit to the public will be incalculable. The success of the method will depend on the proper selection of the examiners. They must be men who are themselves familiar with the duties of the offices to be filled. We look with some anxiety to the result of the application of the system to the professional and technical employees of the city. There is a tendency among non-professional men to over-rate the value of a diploma from a scientific school, and also to attach too much importance to length of service in mere practical mechanics. The examination of a civil engineer should not be confined to his ability to solve mathematical problems at sight, but should include the record of the work he has done and the manner in which he has overcome difficulties. An inspector of engineering works should be examined as to his ideas of the proper way of doing work as well as to what work he has done. The record of both engineers and inspectors as to their relations with contractors should be scrupulously investigated.

It would be an easy matter to so frame the examinations as to exclude all engineers but young men fresh from the class-room, and all inspectors but mechanics too lazy or old to work at their trade, and this will be the tendency of the system unless very good judgment is exercised in the selection of the examining boards.

ELSEWHERE in this issue will be found two documents which have recently passed between the manufacturers of and dealers in plumbing materials on the one hand, and certain representatives of the New York and Brooklyn associations of master plumbers on the other, the latter, as we understand, lead by Mr. Andrew Young, as President of the National Association.

From the public standpoint, the series of propositions submitted by the master plumbers will be considered marvelous in the extreme, and it will be difficult to understand how any body of intelligent business men could have permitted their zeal to get the better of their common-sense to the extent indicated by such a proposal. The propositions in question are only in keeping with the actions of the past, which have done so much to bring discredit upon the craft at large. But the public should understand that the plumbing fraternity numbers among its members some of the most honest, conscientious, and public-spirited citizens of the community, and that these men deeply deplore, and are not in sympathy with many of the things put forth in its name by impulsive men. Many men of this type have connected themselves with trade associations for the purpose of elevating the craft in all that that implies, and not for the purpose of being permitted to carry on their business through the aid of a species of trade-unionism. The agreement proposed by the master plumbers, and claimed to be in the name of the trade, is alike indefensible, unreasonable, and impracticable, and the leading and successful men in the plumbing business have no sort of sympathy with moves of this character, notwithstanding what some of their trade guilds may do or say.

OUR BRITISH CORRESPONDENCE.

Drainage of the Lower Thames Valley—Heat in London—Sewage Purification—The Exhibition of Inventions—Swimming-Baths—The Treatment of Hydrophobia—Health Exhibition Dinner—Fish-Curing—The Telephone in Italy—Overhead-Wires—Gas Exhibition Medals—Dinner to the Foreign Commissioners and Jurors of the Health Exhibition.

LONDON, August 16, 1884.

SIR CHARLES DILKE, on Monday last, signed a minute ordering a general inquiry into the drainage of the Lower Thames Valley. This inquiry has been rendered necessary owing to the scheme of the joint board of the Lower Thames Valley drainage having been rejected by the Select Committee of the House of Commons.

We have had quite tropical heat in London—indeed, all over England—during the past ten days. Thunder-storms have been frequent and very fatal, the daily papers recording deaths from lightning every day. The warmth and fine weather have been very beneficial to the farmers; but places, at best sparsely supplied with water, have suffered considerable inconvenience. In East Kent matters are looking very serious, the water drought having extended to villages or low levels where they do not possess a running stream. In many villages all the water used has to be obtained by means of vehicles from the nearest towns. The extreme heat which we are now experiencing in England has caused great annoyance in many districts where there is a scarcity of water. At Northampton the inhabitants have suffered severely, and they have had recourse to use water from tainted springs for drinking purposes. English cholera has recently broken out in that town, and it is but reasonable to ascribe this outbreak in a great measure to this failure of the water-supply.

The matter of sewage purification by precipitation is again before the courts in an action brought by Messrs. Thornycroft and Donaldson to obtain an injunction to restrain the Chiswick Local Board from depositing sewage sludge on land contiguous to their ship-building works. The total superficial area of the sludge deposit exceeded an acre, and the semi-fluid mass was in a state of fermentation, emitting foul gases. Evidence was produced to show that the amount of accumulated sludge was too great to be treated with disinfectants, and that the only remedy was to cover in the sludge-beds with dry earth and brushwood, or by corrugated-iron. The defendants claimed that they had abated the nuisance in six pits out of nine; that the others were too large and moist, and if covered in at once the whole gas would be concentrated at the works, to the injury of the employees. They claimed that covering over the sludge rapidly produced the most deadly gases, and that a gradual deodorization extending over a period of two months was the proper method! They also asserted that by the end of two months they would have filter-presses for properly treating the sludge. The judge decided to require an undertaking on the part of the defendants to abstain from storing or disposing of the sewage so as to cause a nuisance to the plaintiffs, the operation of the undertaking to be suspended for a month.

The Council of the Exhibition of Inventions, announced for next year, is, apparently, going to profit by the experience gained in connection with the present Health Exhibition, so far as American exhibits are concerned. Instead of "approaching the manufacturers in the official manner"—i. e., with red tape and through the dozen or more embassies of various kinds—and thereby leading to some months' delay, they are going straight to the manufacturers this time. They have deputed Mr. H. Truman Wood, the Secretary of the Society of Arts, to visit Canada and the States to try to secure a representative collection of American inventions.

The Mayor and Corporation of Bath opened on Tuesday last a large and well appointed swimming-bath in connection with the suite of Royal baths already existing in that town; £18,000 are now being spent on the improvement of these baths.

The official journal of Paris recently published the report of the commission appointed by the French Government to superintend the experiments conducted by M. Pasteur for the treatment of hydrophobia. The commissioners regard the experiments as decisively establishing the correctness of M. Pasteur's theory, who, to their minds, has advanced nothing that has not been strictly corroborated by actual experiment.

A dinner was given at the Health Exhibition on August 7, to celebrate the successful installation of machinery for producing the electric-lighting of the buildings. The power required amounts to 1,300 horses, and it is supplied by six steam-engines and eleven boilers, which have run without a hitch for a considerable time, and without any noticeable alteration of speed. During the past week an International Conference on Education has been held daily in the exhibition, when many papers of interest have been read and discussed. On Monday last (bank holiday) more than 70,000 persons visited the exhibition. In spite of this huge number the greatest order prevailed, and no injury was done to any of the exhibits or to the flowers in the grounds.

The Island of Herm, near Guernsey, was recently sold by private contract for £7,500. The purchaser is said to

be a member of a firm of Scotch fish-curers, and it is intended to make the island a depot for the fish-curing business.

Telephonic communication is making some headway in Italy, and some experiments of interest were made last Sunday evening between Rome and Florence. The two telephones were connected by ordinary telegraph-wires, and they worked successfully, although the buzzing of the thermo-telluric current rendered the transmission of the voice rather indistinct; but a cornet played at the Florence end was very well heard at Rome.

In consequence of the Court of Appeal having held that the local authorities have no general power of control over the erection and maintenance of overhead-wires, Government has been asked to introduce legislation conferring some such power on the local authorities. Legislation during the present session is out of the question, but it is probable that early next year a select committee will be appointed to inquire into the subject.

The medals awarded by the jury of the Gas Exhibition of 1882-83, were on Thursday distributed at the Crystal Palace by the Duke of Buckingham. Two gold and twenty-five silver medals, and two diplomas of honor were given for gas inventions for lighting, heating, and cooking.

At a dinner given the other evening by the Lord Mayor to the foreign commissioners and jurors of the International Health Exhibition, Sir James Paget replied to some of the criticisms which have been made. He admitted that the Old London street, the electric-lights, and many of the exhibits had no special application to health, but he claimed that such attractions were necessary, and that people who came to be amused went away instructed, and he said that if any one wished to study any special point in connection with public health, he could tell him just where in the exhibition he could find the means of carrying on his studies. He claimed that the effect of the exhibition would be felt for many years to come. SAFETY-VALVE.

THE TENEMENT-HOUSE COMMISSION.

THE Tenement-House Commission has been busily occupied for over a month in inspecting tenements. Five inspectors have been employed and nearly two hundred houses have been examined. The work is slow, but thorough. From three to four buildings, including rear houses, are covered by each inspector on the average daily. One huge building having nine families on a floor occupied over two days. As fast as the data is collected it is tabulated by the Chief of Inspectors, Mr. Owen. The record is full of interest and will be of great value, as many details are given of which no previous record exists. David McInnis has been recently detailed to specially report on the plumbing in tenements, and Dr. Anna E. Daniels will report on the effects of tenement life and occupation on the health of women and children, which will involve a special study of houses where segar-making, tailoring, hat-finishing, and other trades are carried on.

Recent issues of the Sunday *Herald* have contained a special report to that paper by Charles F. Wingate, one of the Tenement Commission, of an independent investigation which that gentleman has made into the condition of the New York tenements. The report is very elaborate, occupying nearly four pages of the *Herald*, and discusses the effect of tenement life on health and morals, the actual extent of overcrowding, the segregation of population on Manhattan Island, the effect of starvation wages, increase of industrial sickness, etc., with a detailed statement of the remedies which have been tried and which are further needed to meet the evil. These papers will eventually be published in book form, with many illustrations, and will be a companion to "The Bitter Cry of Outcast London," which suggested their preparation.

SPENCER, MASS., has bought the water-works built by a private company in 1882, and the transfer of the works to the town was made the occasion of a grand jollification and speechmaking on August 14. Judge Luther Hill, the President of the Water Company, gave a picnic at Shaw Pond, from which the water is taken, and invited the whole town. About 5,000 people assembled and enjoyed a baseball match, a sack race, a potato race, boat races, a tug of war, exhibitions of diving, a greased pig, and a coffee-bread-and-bean lunch, and other entertainments symbolical of a copious water-supply.

A BOARD OF HEALTH was organized in Seymour, Conn., on August 21.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. HENRY G. MARQUAND.

No. VIII.

(Continued from page 265.)

FIGURE 21 is a view in the servants' wash-room on the basement floor. In this room is the wash-basin shown, an enameled bath-tub, and a porcelain water-closet. Underneath the water-closet is a marble safe with waste, the mosaic floor having a slight inclination to the safe. The water-closet fixtures are all exposed to view, and are simple and neat, similar to that under the basin, to admit of thorough washing out; a portable seat of rosewood with cast-brass lugs resting on the corners of the safe completing the finish. The mosaics of the floor are laid in hydraulic-cement, and the sides of the room are wainscoted for half their height with white porcelain tiles. All the exposed water-pipes in this room are seamless brass, tinned, with nickel-plated fittings and cocks, the waste and other pipes being heavy lead.

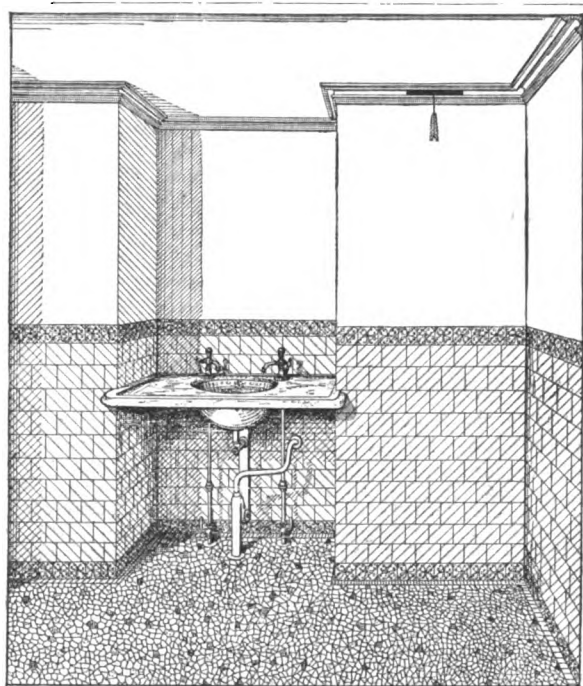


FIGURE 21.

Figure 22 is a view in the cellar where the "safe-wastes" are brought together over a sink. The pipes *f* are the safe-waste pipes from the principal divisions of the house. At their ends over the sink they are furnished with "swing" check-valves to prevent a current of air from the cellar passing up them. The sink is galvanized, and is let into the wall at the end and back, and leaded so as to dispense with a leg at the outer corner. The arrangement of the trap and vent (*b*) are shown, as well as the main water-pipe (*c*), with its branch (*d*), and part of the house-drain, *d*.

Figure 23 is a view in the tank-room. The pipe *C* is the tank-supply, two inches in diameter, and is connected with the caloric engine and with a steam-pump in the cellar. The pipe *a* is the main water-supply from the tank, and is two inches in diameter. It is connected with the tank at the side, and is also carried above the tank for a vent, etc. The pipe *f* is the overflow. It runs to the roof, and is carried up within the tank, as shown by the dotted lines. The pipes *b* and *d* are air and expansion-pipes from the tank and Croton boilers respectively. The pipe *g* is the "draw-off" pipe, and runs to the nearest line of soil-pipe, while the pipe *h* is the safe-waste, and runs to the sink in the cellar (Fig. 22). The pipe *c* is the "tell-tale" pipe, and is three-quarters of an inch in diameter. The tank is made of $\frac{1}{4}$ -inch iron, riveted and chipped and calked. It is six feet high and six feet in diameter, with a band at the top edge and a flanged bottom. The tank-safe is of $\frac{1}{4}$ -inch iron, six inches larger in diameter than the tank, and three inches deep. The edge or side is formed by a flange turned on the bottom, and is in one piece. The whole is heavily painted in white.

(THE END.)

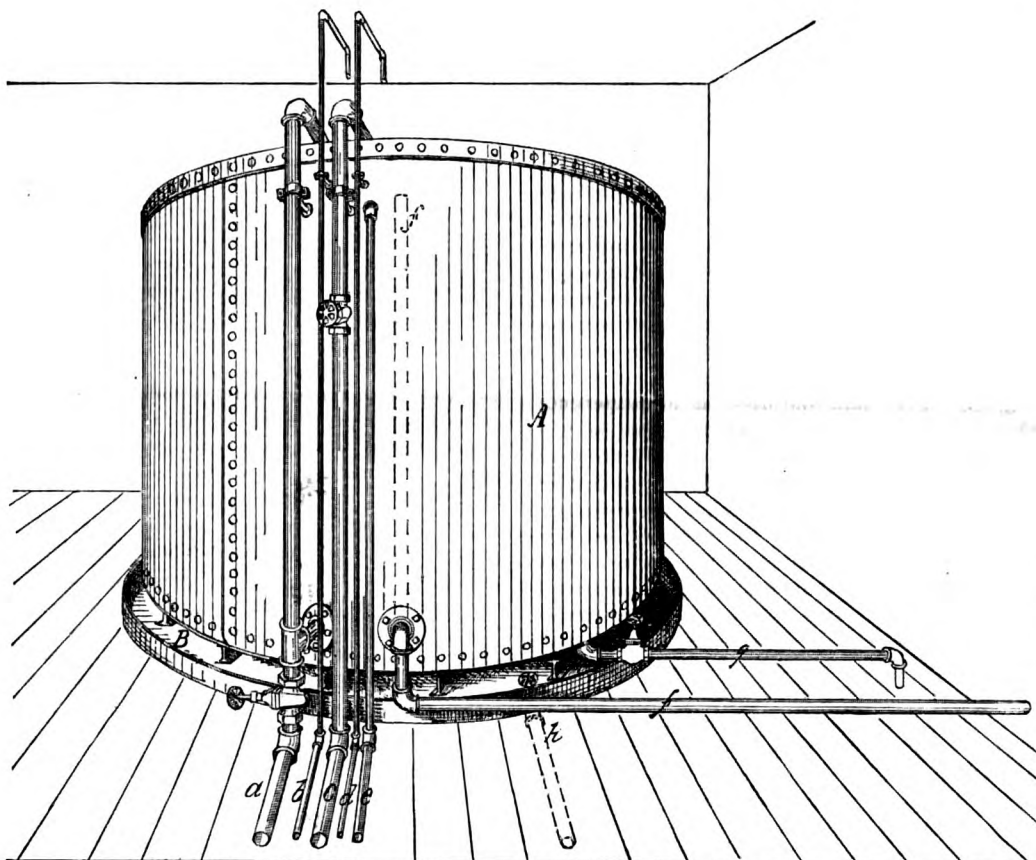


FIGURE 23.

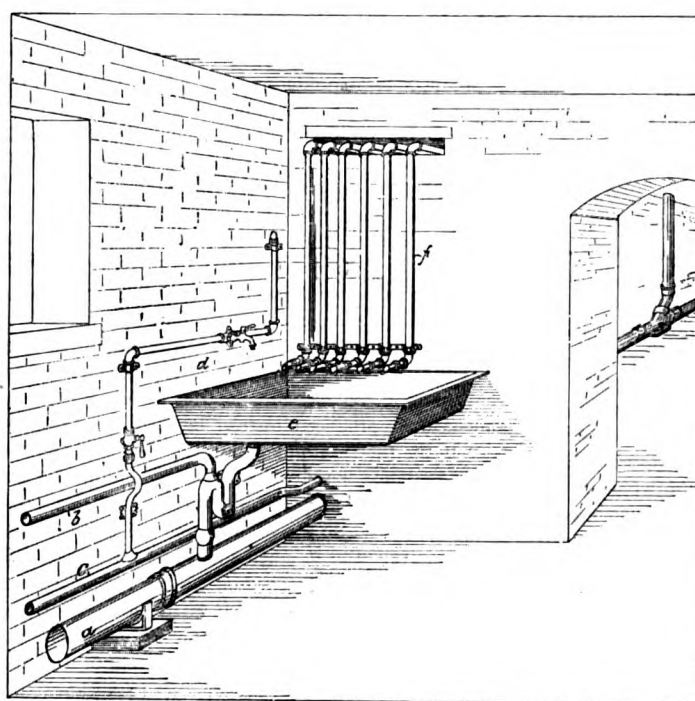


FIGURE 22.

WORK OF THE PARIS MUNICIPAL LABORATORY.

THE following is a list of the principal food articles analyzed in the Municipal Laboratory of Paris during the month of June:

	Total No. Examined.	No. Re- ported as good.
Wines.....	552	113
Vinegars.....	14	6
Beers.....	21	16
Ciders.....	17	7
Alcohols and Liquors.....	16	6
Waters.....	19	6
Milks.....	433	327
Butters.....	13	11
Oils.....	8	5
Flours.....	6	5
Meats.....	2	0
Peppers.....	5	1
Coffees, Teas, etc.....	7	6
Chocolates.....	14	7

COLONEL FLOOD, President of the Board of Public Improvements of St. Louis, Mo., asserts, according to a newspaper interview, that there are 8,000 wells in that city for supplying water for drinking. "The water from a majority of these wells is impregnated with poisonous matter from sewers and out-houses, and is unfit to drink. I do not say it will cause cholera, but it predisposes people who drink it to fever. Because the water from some of the wells is clear and sparkling, a great many suppose it is necessarily wholesome, but such is not the case. In many instances the clearest water is the most unhealthy that can be used for drinking purposes."

IN most of the cases of diphtheria filth conditions are easily traceable. The overflow of filth from a soil-pipe on the lower floor of a 3-story tenement-house, and a broken earthenware outlet-pipe from the house to the sewer, were associated with five deaths, and sink-drainage percolating through a cellar-wall with two others; faulty plumbing with the greater part of those in the cities.—*Report of the Secretary of the Connecticut State Board of Health for June.*

THE Chief of Police of Philadelphia has issued an order to the police, ordering them to report the various gutters and streets which require flushing, and the lieutenants of the districts are ordered to see that the work is done every night between the hours of 10 P. M. and daylight, so far as practicable.

HERE is a friendly word for the cesspool and leaky drain in connection with water-supply. We take the extract from the annual address of Mr. H. C. Bartlett, Ph. D., F. C. S., delivered before the Sanitary Institute:

"In describing a case of great hardship in the attempt to prove that a suburban well was contaminated with sewage, I was much struck with the evidence of an analyst whose reports on the London water-supply are often quoted. He stated with emphasis 'that the presence of normal healthy sewage in drinking-water is not injurious to health, its only effect being to cause those who drink it to become fat'—certainly one of the nastiest aspects of practical sanitation."

The analyst in question might have gone a step further and defined the normal healthy state of sewage, so that we might know where it is absolutely necessary to draw a line.

ON THE MOST RECENT RESULTS OBTAINED IN THE APPLICATION AND UTILIZATION OF GASEOUS FUEL.*

THE production of generator gas is, without doubt, the simplest process in principle in the whole range of the gas manufacture, and yet at the same time it is a very complex process, the variable results attending which are not yet thoroughly understood, although so many thousand tons of coal are yearly employed in its practical working. It is true that a very fair average quality of gas can be obtained from the useful primitive structures which have proved such good every-day working tools. But their great inventor, whose loss we must all so much regret, did not himself consider them perfect, though they fulfilled perfectly his object—the production of a cheap gas to be used in conjunction with regenerators. Those who have practical experience in working producers, of whatever type they may be, will recognize how important a point it is to be able to break up easily the mass of fuel contained in them, to keep them open and of the right degree of porosity, and yet avoid their breaking through into large holes. They will say, too, how much the attainment of such results adds to the labor cost, while they are essential to the uniform and successful production of good gas. It is entirely by careful attention to this point that the fire is prevented from becoming dead with a mass of solid uncoked fuel above bearing directly upon it, instead of passing gradually from a full, white heat to a glowing red coke, and then partially coked coal, and the raw coal drying on the top, which is about the ideal of good working; or, if the fire be not dead, it is allowed to blaze away through some chimney-hole formed in the fuel above, with the heat all concentrated into the one spot, and a furnace temperature of sometimes 1,800° F. or 2,000° F., or even more in the top of the producer over the coal, and the consequent inevitable loss of heat and passage of bad gas, loaded with sulphurous-acid, into the furnace. Now, regenerators have such a marvelously steadying action, that this sort of thing may go on to a considerable extent, alternating with the production of good gas, without, in many applications, interfering with any other result than the economy of fuel; and in blast-furnaces, which are gas-producers of a very highly efficient type indeed, this compensating action is obtained by the enormous depth of fuel, which practically gives the combining surface absolutely required, even though there be large holes in the fuel, and allows, in addition, plenty of time to coke the coal and prepare the fuel, although at the expense of enormous driving power. This driving power is allowed for and submitted to in blast-furnaces, where good iron is the chief thing to be made, and not gas or gas products; but in gas-producers, I fear, a driving pressure of some four or five pounds per square inch would be out of all question. Now, since the main object of a gas-producer is to expose a sufficient surface of incandescent fuel to the current of air passing through it and thus to convert the whole of the oxygen in this air into carbonic-oxide before passing up through the upper layers of fuel, it follows that all producers should be so arranged that if the fuel be sodden down together or broken through into holes, the parts that are out of order can be instantly attached and restored to their normal condition. When coal is put into a retort, gas of a certain quality can infallibly be produced from that coal if only the fire can be kept up under the retort; and I submit that the same thing ought to obtain in the making of generator gas, and that if this be not so—if the conditions necessary to produce the highest possible quality of gas be a matter of chance and uncertainty and not attainable at a moment's notice—the system is so far a failure. The measure of the quality of producer gas is the amount of carbonic-acid and pure oxygen present in the gas and the temperature at which the gas escapes from the producer, and as well of the quantities and qualities of the tar and ammoniacal products. In general the quantity of CO₂ will vary from four per cent. to seven or even nine per cent. in some producers, while the temperature of the escaping gases varies from 1,200° F. to 2,000° F., and the tar, owing to the coal not having been thoroughly coked before the formation of CO₂ has ceased, will be found to be charred and of little value, while the ammonia will be partly destroyed, and any that remains will be found to be in the form of fixed salts or sulphates. A result of the experience I have had in this matter is the conviction that the common plan of working producers by hand labor is a totally inefficient one, which leaves the quality of the gas produced

a matter of chance and dependent upon whether the teaser can hit upon the sore place in the producer, and that often only after severe and exhausting labor. To obviate this I have pointed out in a previous paper that "mechanical stirring should be resorted to," and the plan which I have adopted for that purpose I now beg to describe.

The producers are made of cylindrical form, and through the centre a vertical revolving spindle passes, carrying on the end a stirrer to plough up the fuel. This is made preferably diamond-pointed to enter and loosen the fuel, and carries two arms, like propeller-blades, which screw their way into the fuel, and at the same time loosen it and break it up effectually. The top of the spindle is cut into a screw, which moves through the nut in the girder overhead. The spindle is worked up and down by the gearing shown on the diagram, and is controlled by the right and left-hand clutch-gear shown; while the whole is driven by a small engine. As only one producer needs stirring up at a time, very little power is required to do the work, and as the labor on the top of the producer is thus limited to putting in the coal and working the clutch-levers (if, as is generally the case, the coal be brought up in suitable trucks), it will be found that the economy realized will be considerable. I have found that with high speed gas-producers about four feet in diameter, up to five hundred-weight per hour of coal can be worked through, and that if the stirring be properly done no carbonic-acid may appear in the gas, while two per cent. and no free oxygen should be looked for at most. But I do not believe, after allowing for the CO₂ present in the coal, that it is possible to attain such results always by hand labor, and while I estimate that by the use of mechanical stirring the labor on the whole producer can be brought down to somewhere about 4d. or 6d. per ton, a very great saving can certainly be effected by improving the quality of the gas produced, and I am quite sure that in order to get tar and ammonia of good quality good stirring and low heats on the top of the fuel are absolutely necessary. There is not much to add at present to the description of our apparatus for getting those products from producer-gases, which I gave in my last paper. In order to obtain good gas and bye-products, the gas must be well cooled. If the gas be not cooled down, the quantity of water which it will suck up from the washing apparatus is so great as to destroy the value of the gas for heating purposes, while the ammonia is carried bodily away, even if it be in the form of fixed salts or even sulphates, and the lighter and more volatile constituents of the tar are carried forward and burnt. At present the maximum quantity of ammonia-sulphate obtained per ton of coal is about twenty pounds, but I am well aware that more may be got by sacrificing the gas, because it appears that if steam comes in contact with hot fuel in such a way that carbonic-acid is produced instead of carbonic-oxide, the nitrogen in the fuel is eliminated in the form of ammonia, and at first glance, since each atom of CO formed in this way into CO₂ liberates its equivalent of hydrogen, there would appear to be no loss of heat, but the carbonic-acid formed is equivalent to so much additional nitrogen; it is, in short, a dead-weight fastened on, and every one who has to use gas knows how desirable it is to get the very best quality attainable. The quantity of tar got varies with the nature of the coal, perhaps more so than that of the ammonia, but about twelve gallons appears to be about the normal quantity.

It must not be forgotten, however, that the depth of the fuel has an important bearing upon the production. In blast-furnaces using Scotch coal, my associates, Messrs. Alexander and M'Cosh, are getting as much as twenty gallons of good tar per ton of coal. There is another advantage in good stirring which is of no small moment, and that is, that the gas leaves the producer so much cooler, which represents great economy of fuel, much less cooling surface in the condensers, and less water for finishing the condensation. There are several other vital points to be attended to in getting the triple products—generator gas, tar, and ammonia; but what is now doing is this: gas of high quality can be got with certainty along with up to twenty pounds of sulphate of ammonia per ton of coal, and from ten to twenty gallons of good tar. The labor upon the producers and plant can be reduced to about from 4d. to 6d. per ton of coal passed through, and thus a net saving of about 2s. 6d. to 4s. per ton of coal may be effected.

Now, I have no doubt I shall be asked, What about the quality of the tar produced? Well, we do not profess to make tar of the same quality as the gas-works tar. The aromatic series is not formed at the present time, but it is

a fact that the whole of the enormous quantity of tar above given is being put into the market, and that it is all disposed of, although for what purposes I am not prepared to say. It is also true that benzol and the aromatic series are in part being prepared from this same tar in considerable quantities, and if any doubts occur to your minds as to the uses to which these tars are to be applied, let me remind you that the matter is only in its infancy, and that additional uses are being found for these products; while it is a fact that in Scotch oil-works, if the value of some of the oil produced goes down to four times the value of the fuel used to heat the retorts, it is found advantageous to use it as fuel under the retort instead of the coal generally used. Reasoning from this fact it would appear that the time is not far distant when tar or tar-oil will be the fuel used on steamships, whereby only about one-half the present space, or even less, will be taken from cargo-room. There will also obviously be an enormous saving in the labor of stoking and an absence of smoke. In conclusion, I would wish to point out what a fallacy it is to suppose that the condenser forms the bulk of the cost of the plant; on the contrary, I can show on any estimate that it is not more than from twenty-five to thirty per cent. of the cost; and I can show, too, that the extra tar and ammonia produced is sufficient, not merely to pay for this, when taken in conjunction with the necessity of drying the gas to get good heating-power out of it, but to pay as well for the whole of the plant put down. I should wish you, moreover, to recollect that in blast-furnace practice as well as in gas-producers the use of the gases for heating stoves and boilers, and for evaporating, is of far too great importance to be neglected. So far from the elimination of the tar and the cooling of the gases interfering with their heating-power, it is found at Gartsherrie that in this way a less amount of gas is used even than before.

DR. J. J. WOODWARD, SURGEON U. S. A.

As announced in our last issue, Dr. Woodward died on the 18th inst. He was born in Philadelphia in 1832, and received his academic education in the Central High School of that city. He was graduated in medicine from the University of Pennsylvania, and began to practice in the year 1853. In August, 1861, he was appointed an assistant surgeon in the U. S. Army. He distinguished himself in the war, and was successively promoted to the rank of Lieutenant-Colonel for faithful services.

Dr. Woodward attained considerable prominence in his profession through the publication of a number of treatises on abstruse subjects, especially on the use of the microscope in the practice of medicine. He published a number of valuable papers, among which are: "Address on the Medical Staff of the United States Army," "Remarks on Croup and Diphtheria," "Typho-Malarial Fever—Is it a Special Type of Fever?" "Remarks on Photographic Micrometry," "Application of Photography to Micrometry, with Special Reference to the Micrometry of the Blood in Criminal Cases;" report on "Medical Literature," and report on "Causes and Pathology of Pyæmia." He also edited the "Surgical and Medical History of the Rebellion."

When President Garfield was shot, on July 2, 1881, Dr. Woodward was in Washington in the Surgeon-General's Bureau. He was one of the surgeons first summoned to the bedside of the wounded President. He remained in constant attendance there until September 7, when he retired in company with Drs. Reyburn and Barnes. He leaves a widow.

DR. HIME, the Medical Officer of Health of Bradford, Eng., is to be congratulated on his powers of resource. A case of small-pox being reported to him, he obtained the clothes of all the persons with whom the patient (a young woman) had been seen during the preceding days and disinfected them, disinfecting also the patient's dwelling. A young man who, it seems, was "interested" in the patient, and had been seen in her company, objecting, the Doctor persuaded him to take to his bed to undergo a medical examination, and then bolted into a cab with his victim's clothes, which were returned after a period of about ten hours. No other small-pox cases followed this attack.

UTICA, N. Y.—The Water-Works Company has made a proposition to the city to reduce the amount of interest it receives on capital expended in extending the mains from seven to six per cent. It also offers to make an important extension of its mains at a cost of \$75,000, if the city will pay five per cent. on the cost annually. The Common Council has the proposition under consideration.

* Paper read before the Iron and Steel Institute, by Mr. W. S. Sutherland, of Birmingham.

THE MASTER PLUMBERS AND THE MANUFACTURERS AND DEALERS.

As stated last week, the manufacturers and dealers in plumbing materials held a meeting on the 19th inst., for the purpose of considering the following propositions, which they had been asked to sign by representatives of the New York and Brooklyn societies, headed by President Andrew Young of the National Association, at a conference held on the 14th inst.:

COPY OF AGREEMENT WHICH THE MASTER PLUMBERS' ASSOCIATION WISH THE DEALERS AND MANUFACTURERS TO SIGN.

Propositions presented to the Associations of New York and Brooklyn, and adopted unanimously:

1st. That the manufacturers and dealers in materials shall not sell to others than licensed plumbers, who shall exhibit a certificate duly signed by the president and secretary of their respective association. This certificate guarantees that such plumber is entitled to all privileges and be renewed every three months.

2d. That no manufacturer or dealer shall figure on plans or specifications for any person, whether engaged in the plumbing business or not.

3d. That no plumber, manufacturer or dealer in patented articles shall sell to others than licensed plumbers as stipulated in Article 1.

4th. That any plumber who waives his discount in favor of his customer shall be dealt with as one not entitled to the regular trade discounts, and his certificate shall be revoked and remain so until he be properly reinstated and receive a new certificate from his association.

5th. That manufacturers and dealers shall not furnish repairs, or do the same, except through a regularly licensed plumber.

6th. That manufacturers and dealers shall not become sureties for the fulfillment of any plumbing contract.

7th. That where manufacturers and dealers require security from plumbers, such security shall not be accepted from any interested party, whether owner or contractor.

8th. Agents of manufacturers and dealers shall be prohibited from selling plumbing goods to any person other than those stipulated in Article 1.

9th. That the manufacturers and dealers pledge themselves not to sell or deal with any person or persons other than those stipulated in Article 1.

After some consideration it was decided to make the following reply to the above propositions, and a committee of two was appointed to present it to the plumbers at their adjourned meeting on the 21st inst.:

MR. A. YOUNG, CHAIRMAN NATIONAL ASSOCIATION MASTER PLUMBERS OF THE U. S.

DEAR SIR: We much regret the receiving from your association the set of resolutions which we now most respectfully return. We regret it for the simple reason that we do not like to feel that a document so untenable, so unbusinesslike, so opposed to all the established laws of commerce and trade, both written and unwritten, should have emanated from your body; and which, were it possible to carry into effect, would not only, in our opinion, be ruinous to your business, dishonorable to yourselves, but would place you in the very unenviable light of extortionists before the eye of the public. To say that we cannot give it any consideration seems almost like reiteration; nor can we yet believe that it represents the intelligence, or that it is the result of the thoughtful and deliberate majority of your craft.

We further regret the position you have placed us in, as we are most desirous of furthering the interests of the plumbing trade, recognizing how largely our interests are mutual; why you, as intelligent men, do not see and appreciate this fact, we are at a loss to explain; it cannot be possible that you so under-rate our business ability and common-sense that you imagine we cannot see that the most friendly and intimate relations with the plumbing trade is to be desired by us above all things. Furthermore, we must embrace this opportunity of stating most distinctly that we find no just cause for any special protection, other than that which the usual and accepted laws of commerce accord alike to all. That misunderstandings do occur, that there should be friction sometimes, is only in the nature of all human things, and no set of resolutions can make it otherwise; but why these matters cannot be adjusted by the usual business methods in the future, as they have been in the past, we fail to see.

Finally, let us ask you, and believe that we do so in the most friendly spirit, do nothing rashly, confer with the less impulsive and conservative members of your association; also, remember that a great deal of good may result from mutual confidence and friendly intercourse, while combinations, threats, and such like, will only tend to provoke opposition. And let each one, whether buyer, maker, or dealer, look to a well-earned reputation for upright and honorable dealing as the only lasting and safe protection of their interests.

Respectfully yours,
Fred. Ade & Co., Abendroth Bros., Myers Sanitary Depot, Tatham & Brothers, The J. L. Mott Iron-Works, McNab & Harlin Mfg. Co., The Meyer, Sniffen Co. (Limited), Mayor, Lane & Co., Chas. Harrison & Co., Miller & Coates, Ronalds & Co., Henry Steeger & Co., Jochum & Jetter, James Bulger, Jr., Theodore Susemihl, L. Brandeis & Son, John Trageser Steam Copper-Works, Colwell Lead Co., Durham House Drainage Co., Wm. H. Hussey, Staats & Dillmeier, Henry Huber & Co., Williamsburgh Lead-Pipe Works, The E. G. Blakeslee Mfg. Co., L.

Waefelaer Co. (Limited), Geo. D. Kimber & Son, Cassidy & Adler, Jamer, Jacobs & Co., Thomas Maddock & Sons, Peck Bros. & Co., David Morrison, The Le Roy Shot & Lead Mfg. Co., Hunter Keller Mfg. Co., Bird, Faulkner & Co., T. R. McMann & Bro., J. C. Bryan, Henry McShane & Co. (subsequently withdrawn).

EGYPTIAN PRISONS.

MR. CLIFFORD LLOYD, in a letter to the London *Times*, in defense of his administration in Egypt, quotes the following report on the condition of Egyptian prisons under the infamous Turkish rule. The reference to their sanitary condition reads very much like credible accounts of some prisons in the State of Kentucky that we have seen:

"In all prisons the same system prevailed of allowing all classes of prisoners to mix up together, irrespective of the nature of the offense they were charged with or had been sentenced for; it was the invariable rule to find in the same room old, hardened criminals and innocent young men; murderers sentenced to hard labor for life or exile and boys accused of petty offenses awaiting trial; and side by side with desperadoes who had passed the greater part of their lives in prison would be found respectable old sheikhs of villages, whose wealth had induced some Government official or jealous neighbor to bring forward a false charge (supported perhaps by false evidence extorted by torture), which usually resulted in unjust imprisonment, awaiting trial, or to put it more correctly, awaiting the transfer of a certain amount of 'backsheesh' to procure a discharge.

"The prisons, when handed over to the department, were, without exception, in a disgracefully filthy condition (in many cases the accumulation of years) and overcrowded to a dangerous extent, not only with human beings, but blocked up with the baggage, bedding, and household goods of the prisoners. In many cases the prisons were insufficiently lighted, and no attempt made at ventilating the rooms except by the door, which was often the only inlet for light as well as air, and the inevitable result was that in most prisons the sickness among the half-starved prisoners was a good deal above the average.

"The prison of Benha, for instance, may be taken as a fair sample; it consists of two rooms of unequal size, which, when first inspected, were overcrowded with prisoners.

"The larger room, containing sixty men, was lighted by two small windows two feet square, no ventilation spaces existed in the roof, the walls of the roof were black with dirt, and the floor, consisting of the bare ground only, was constantly damp from the water thrown about by the prisoners and infiltration from the Nile; the prisoners slept on the damp ground, neither mats nor boards being provided by the authorities. The latrines consisted of a number of holes in the ground at the far end of a court-yard, surrounded by a broken-down mud wall about three feet high; the contents of these latrines drained into a cesspool (which was filled to overflowing) lying alongside a well, from which the prisoners drew their water-supply. Typhoid fever had broken out recently, somewhat severely, and the prisoners without exception had a sickly appearance.

"In some cases the Government provided a certain number of straw mats for the prisoners to lie on; in other cases the floors were boarded over, but in by far the greater majority the prisoners had only the bare, damp ground to sleep on.

"The floors of the Cairo prison were entirely boarded over, and had evidently not been cleaned for years; on close examination the boards were found to be in a very rotten condition, and on their removal, the space between them and the stone floor was found to be the hunting ground of rats, frogs, scorpions, and other vermin; the stench was so overpowering from the infiltration of the soil from the adjoining latrines that it was found necessary to keep the rooms vacant for several days while they were undergoing thorough disinfection and a new stone flooring was being laid down.

"The means of punishing prisoners in common use previous to January 1, were the bastinado, the stocks, the indiscriminate application of heavy iron chains, and thumb-screws (kallapse), and the withdrawal of bread and water for 24 hours; these cruelties were not only inflicted for punishing unruly prisoners, but in by far the majority of cases to extort false evidence against innocent people, or for backsheesh.

"The bastinado or kourbash was frequently applied. The prisoner was made to lie on the ground face downward, and held in that position by a man sitting on his back while another one held his arms; the ankles were then tightly fastened to the middle of a thick stick (naboot)

about five feet long, which was twisted around once or twice, and then held well raised above the ground by two men, while a warder, with a rhinoceros-hide whip, inflicted as many as 500 blows across the soles of the feet—the prisoner frequently died within a few hours of collapse, or if he recovered from the immediate effects was unable to walk for weeks after.

"The application of stocks was made more cruel by placing the feet reversed, with the victim lying with his face to the ground; while a not uncommon form of torture, which I certified so recently as eight months ago, was to keep a prisoner standing for hours in the middle of his cell, with a strong iron chain around his neck fastened to a beam overhead; had the prisoner fainted strangulation would have certainly resulted."

THE POLLUTION OF THE SCHUYLKILL RIVER. (Special Correspondence of THE SANITARY ENGINEER.)

PHILADELPHIA, August 23, 1884.

IN pursuance of the resolution of City Councils, referring the matter of the pollution of the Schuylkill River water by certain corporations, firms, and individuals emptying their refuse matter into the river and the Wissahickon Creek, and directing him to take immediate steps to stop the nuisance, the City Solicitor, on August 22, had warrants issued for the arrest of Messrs. G. A. & Charles W. Soulas, of the Riverside Mansion, Fitzpatrick & Holt, Stelwagon & Sons, and James M. Preston, mill-owners.

When the matter was placed in the City Solicitor's hands, he employed Mr. Dana C. Barber as an expert to examine the source of complaint, and he has made a careful examination of the mills and other places complained of.

Mr. Barber, in his report, says of the Riverside Mansion, owned by the Soulas Brothers: "The urinals and water-closets drain directly into the river through underground pipes, the lower end of which passes through the river wall. In view of the comparative proximity of the place to the pumping-stations of the Water Department, two and one-half miles above Belmont supplying West Philadelphia, and three and one-half miles above Spring Garden supplying the greater portion of the city proper, and the readiness with which specific disease-germs contained in *feces* are transmitted and taken into the system by drinking water, I believe are dangerous to the health of Philadelphia. Stelwagon & Sons are the proprietors of a paper-mill on the island below the lower bridge, Manayunk, manufacturers of thick, coarse, roofing and sheathing-paper, and use about six tons of raw material per day, consisting of 50 per cent. of cloth rags, 30 per cent. of shoddy-waste from cotton and woolen mills, and in consequence a large quantity of refuse is thrown daily into the creek, and about two or three barrows of shoddy-dust are dumped on the bank, and there is now along the creek bank about 160 cubic yards of this dust. The contents of a water-closet used by twenty-four men is also drained into the creek.

"Fitzpatrick & Holt employ 300 persons in their mill. All the employees use privies and urinals over chutes leading to the brook, which flows under the mill and serves as a sewer for conveying all liquid refuse to the creek; the chutes are occasionally washed out by a hose, since some of the solid matter adheres to the bottom. These mills use monthly, according to a statement of the proprietors, extract of logwood, 8,000 pounds; soda-ash, 1,400 pounds; bluestone, 1,000 pounds; catechu, 500 pounds; chrome, 100 pounds; and 10 pounds of aniline dyes.

"James M. Preston employs 113 persons, all of whom use privies and urinals, which are emptied into the creek, and the waste from scouring between 150 and 200 blankets with fifty pounds of soap and eight pounds of soda-ash per day, is discharged into the river.

"J. D. Heft employs sixty operatives who use water-closets discharging immediately into the river, and the wash from dyeing 12,000 pounds of yarn per day with the following material is also discharged directly into the river: 200 pounds of extract of logwood, 50 pounds of indigo, 50 pounds of cutch or catechu, 30 pounds of aniline dyes, 16 pounds of bluestone, and 60 pounds of soda-ash."

Magistrate Smith, before whom the case was called, fixed August 25 for the hearing of the defendants.

It is the intention to prosecute these cases criminally under the common law, and they will be pressed to a conviction in order to have the nuisances abated.

THE Croton-water debt of the city of New York, on December 31, 1883, was \$11,529,700. During the year 1883 bonds to the amount of \$1,080,000 were issued, and to the amount of \$424,600 were canceled.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XIV.

(Continued from page 270.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

OUT-OF-DOORS, NEAR WESTERN GALLERY.

No. 1,231. J. H. Porter, 1 Tudor Street, London, E. C., exhibits his apparatus for the softening of hard water. The process employed is by no means new, having been devised and patented about the year 1844, by Professor Thomas Clark, of Aberdeen. The patent long since expired, and the process, in its original form, never found very extensive application, on account of certain technical difficulties which Mr. Porter claims to have overcome. The method may be employed in cases where the hardness of the water is due to the presence of carbonate of lime, or (less easily) when the hardening substance is carbonate of magnesia; it is not applicable where the hardness is due to the presence of sulphates. The carbonates of lime and magnesia, although insoluble in water, enter into solution if carbonic-acid gas be also present, and the process consists in adding milk of lime, which combines with the dissolved carbonic-acid to form carbonate of lime. Since this is of itself insoluble it settles out as a fine white powder together with the carbonate of lime (or magnesia) previously present in solution. The peculiar features of the Porter process are the use of a solution of lime-water—instead of the milk of lime of Professor Clark—and the filtration of the turbid liquid as soon as a thorough mixing is accomplished, instead of waiting for the oftentimes slow settling of the carbonate. By the apparatus on actual exhibition, the London water which is treated is reduced from fifteen degrees of hardness to four degrees, at the rate of 400 imperial gallons per hour. Figure 1 (for the electrotype of which we are indebted to Messrs. John Wiley & Sons) shows the essential features of the apparatus. The lime-water is prepared in the left-hand cylinder, which is furnished with a mechanical stirrer; the lime-water thus prepared is mixed with the water to be softened in the right-hand cylinder. The sediment is removed by the filter-press shown on the extreme right, the material employed being a superior quality of twilled cotton, and the press itself being specially adapted to filtration under pressure of a large volume of liquid containing a comparatively small quantity of solid matter in suspension.

The process here shown is, of course, practicable on the large scale; in fact, at the present time the London & North-Western Railway Company at four of its stations is in this way softening 1,000,000 imperial gallons of water daily for use in its locomotives.

Mr. Porter also exhibits a form of apparatus which may be employed where the water is delivered under pressure, and where it is desired to avoid the use of mechanical power for agitating and for pumping the water. The principle of this apparatus is shown by the accompanying diagram, Fig. 2.

A proper amount of lime is put into the cylinder A, which in the beginning is filled with water, and contains a stirrer which can be turned by hand. The lime-water is then allowed to settle, and mixed with the hard water in the vertical cylinder B, from which the mixture passes to the press, C. In order to raise the lime-water to the top of B, and also to force the softened and filtered water to a tank, say at the top of a house, the cylinder D is employed; this, if full of air and connected with the water-supply by a pipe, P. The air in D becomes compressed and transmits the pressure to the surface of the lime-water in A, and forces the lime-water upward through the pipe *e*. The proportions of the air-vessels are determined by the quantity of lime-water to be gradually transferred to the mixing cylinder, and by the height at which the softened and filtered water has to be delivered. At the end of the day's working the valve *v* of a pipe which connects the two vessels A and D is opened, and the water which has meantime risen to fill D, is forced back into A, where it is converted into lime-water by the stirring up of the lime in the bottom of the cylinder, and after settling overnight is ready for the next day's work. This apparatus has already been put into a number of country-houses.

SOUTH ANNEX.

Messrs. George Waller & Co., Phoenix Engineering Works, Holland Street, Southwark, London, E. C., (stand 492), exhibit their patent manhole-cover for side entrance to sewers. This is an improvement on

the old-fashioned covers so generally used, inasmuch as it can, by removing a locking-bar on the underside, be converted into a ventilating grating during the time the men are at work in the sewer; and it is also made so that it need not be left standing open, thus removing the danger of injury to people by falling over it. Among other exhibits may be mentioned charcoal ventilators, gully-grates and traps, sewer-gratings, tide-flaps, penstocks, ventilators with dirt-pans for fixing in paving over the drain; also

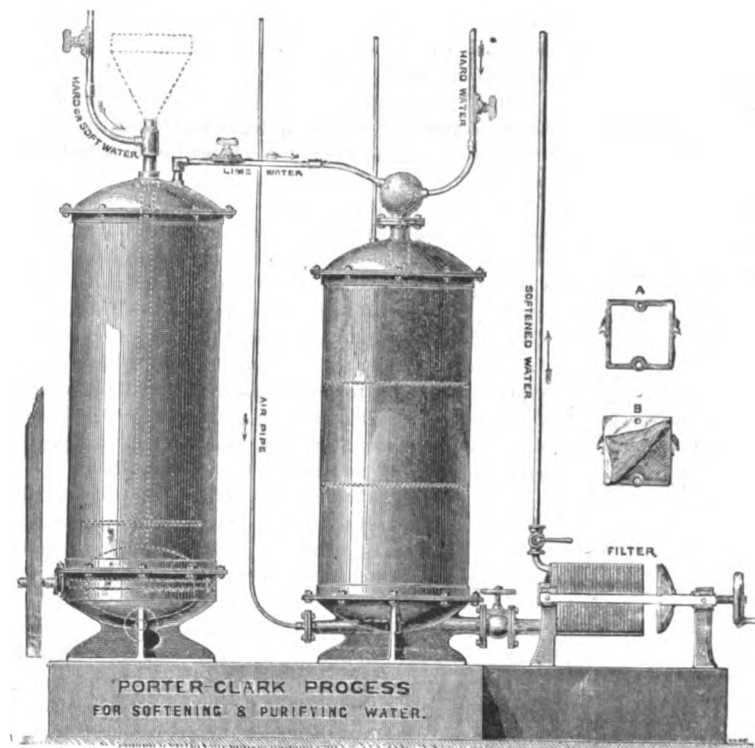


FIGURE 1.

their street orderly-bins for boys who collect horse refuse in the streets to deposit what they sweep up ready for carting away. Their "sunk orderly-bins" are for the same purpose, but are fixed below the paving in cases where there are no room for the other kind.

Edwin Page, architect, 4 Henrietta Villas, Godwin Road, Forest Gate, Essex (stand 490), shows a grease-intercepting gully-trap for kitchen-sinks, to prevent drains being stopped by fat. This trap has a movable wire-work lining in the receiving part of it.

Mr. Hewes, Leicester (stand 480), shows his cremator and gas-maker from house-refuse.

Messrs. Ingham & Co. (stand 491), exhibit Stanford's patent joint for fire-clay or stoneware drain-pipes, with which engineers are generally familiar.

Henry Dean, 9 Myddleton Square, London, E. C., or Wolstanton, Stoke-upon-Trent (stand 482), exhibits his well-known patent drain-trap and gully, with an internal removable cast-iron lining. This trap is especially constructed to catch and retain sand and other solid matter from being deposited in the drains.

The Great Yarmouth Urban Sanitary Authority, Great Yarmouth, England (stand 485), exhibits a portable flushing-tank for flushing small-pipe sewers, which is on wheels and can be drawn by a horse to any position that is desired for its use.

Hugh S. Cregeens, Bromley, Kent (stand 488), shows a patent air-inlet to drains, so arranged that all foreign substances are prevented from falling into the drain, as in the case of the ordinary gratings. The sole manufacturers are Messrs. I. Stone & Co., Deptford, London, S. E.

W. Batten, C. E., 150 Lozelles Road, Birmingham (stand 475), exhibits a patent ventilator and manhole-cover for sewers. The objects claimed is that it is a combined ventilator, flushing-box, and lamp-hole, with a dirt-box to prevent road-waste falling into the sewers.

John Watts & Co., Broad Weir Works, Bristol (stand 474), show their asphyxiator for testing drains and smoking out insects, vermin, etc.

I. I. Ellis, Ellistown Collieries, Ellistown, Leicester (stand 472), exhibits specimens of drain-pipes and junctions, both of vitrified-stoneware and fire-clay. Also specimens of stoneware-sinks and other drain-fittings.

Messrs. Houghton & Co., 21 Sloane Terrace, Chelsea, London, S. W. (stand 471), exhibit a fat-interceptor for sculleries, a gully-trap with reversible top, and an inter-

ceptor-trap with a movable iron-pot for retaining solid matters which would otherwise pass into the drains.

Messrs. Bailey & Co., Fulham Pottery-Works, Fulham, London, S. W. (stand 469), show potteryware drain and channel-pipes and bends; also junctions and various kinds of traps. A range of urinal-basins is shown branched into a horizontal pipe, with a weir at the outlet end, so that water is retained in the whole length of piping, and in the bottom of the basins. They are flushed with an automatic

apparatus fixed at the upper end. They also exhibit stoneware sinks and Banner's drain-trap, and Roberts' drain-pipes with water-tight joints without the aid of cement. On stand 473 Messrs. Bailey & Co. exhibit Noot's patent drain-pipes and junctions. The advantage claimed for these pipes is that any pipe can be removed for the purpose of cleaning or inspecting a drain without the destruction of the pipes.

Dr. Lettich, 231 Kennington Road, London (stand 466), exhibits a model of a ventilating-shaft for street-sewer manholes.

On stand 465 is shown a piece of an oak drain-pipe over 100 years old, found under the foundations of Hatchett's Hotel and White Horse Cellars, Piccadilly, London. The specimen is six feet eight inches long. The hole through it is large enough to pass the hand easily into it. The outside is square, and measures about seven inches on each face. A cut section shows the wood to be oak, and to be hard and free from decay, excepting on the inner and outer faces, which came in contact with moisture. The soil beneath where it was discovered, and some distance

around it, was found to be completely saturated with sewage matter, showing the importance of drains being made of imperishable material, laid with water-tight joints by skilled workmen, under proper supervision.

The North British Plumbing Company, 40 Upper Baker Street, London, W. (stand 493), shows good specimens of cast-iron soil and drain-pipes and fittings and connections, covered inside and out with a highly glazed coating, to render them less liable to corrosion. Its sewer-disconnector is a hopper and trap all in one piece, with branches for any side inlet-pipes that may be required. On the outlet side of the trap is a brass screw-cap, which can be re-

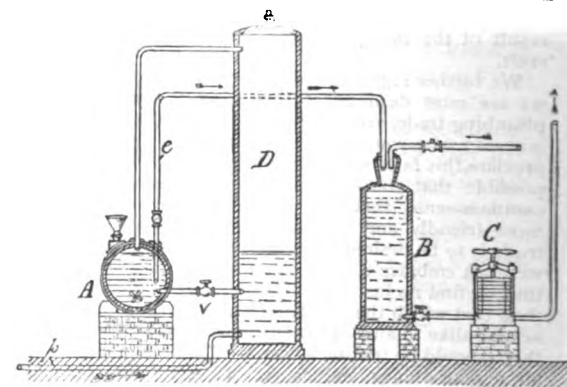


FIG. 2.

moved, and so give access to displace any obstruction between the trap and the sewer. It also exhibits a "cast-iron terminal," with a similar removable cap, for fixing at the extremities of drains, so that any cause of stoppage can be removed without opening the ground or breaking any of the pipes.

T. H. Harrison, 21 Harrington Street, Liverpool (stand 481), exhibits his improved joint for connecting a lead pipe to an earthenware one.

Frederick Bird & Co., 11 Great Castle Street, Regent Street, London, W. (stand 478), exhibit several cast-iron fittings, such as gullies and gully-traps with silt-boxes, tide-flaps, sliding-penstocks, flood-gates, and sluice-valves.

The Victoria Stone Company, 283a Kingsland Road, London (stand 477), exhibits several specimens of artificial stone, its concrete-sinks being worthy of mention as not

being so porous as the ordinary stone sinks so much used in sculleries. This may be said of the productions of all makers of this kind of sink.

Messrs. Stiff & Sons, Lambeth, London, S. W. (stand 476), exhibit good specimens of vitrified stoneware drain-pipe and fittings, a double dip-trap, and Weaver's patent sewer-disconnecting trap. They also show good examples of yellow-ware sinks, etc.

Henry Masters, architect, Bristol (stand 468), exhibits drawings showing his methods of arranging house-drains and making provision for the ventilation of dwellings.

In the French Court, A. Flicataux, Rue du Bac 83, Paris, shows wash-stands constructed of sloping marble slabs, with overhead-taps for continuous water-supply while the troughs are in use, the water running to waste as used.

Rogier & Mothes, Cité Trevise 20, Paris, show models of balance-valves for closets, sinks, etc., and in their application as traps for such fixtures. They also show various forms of invalid commodes, "squat," and other closets, and a model of a balance-valve trap, for fixing under the curb of a sidewalk to carry off rain-water or street-washings, and of sufficient capacity to take off also any dog or child that might happen to slip and roll that way. The various types of water-closets are mainly interesting as indicating principles in construction that should be avoided, and yet they are of the character in general use in France.

EAST QUADRANT.

The East Quadrant is devoted, with but few exceptions, to the exhibition of the various grates, stoves, and ranges used in cooking, heating, and ventilating.

Stand 677 is the exhibit of Frederick Dyer, of 66 High Street, Camden Town, London, who shows a patent automatic tidal valve-trap. The valve takes the shape of a copper ball-float, pendant by an arm hinged on the roof of a chamber into which the inlet and outgo branches open. The hinge only allows a play toward the inlet-pipe, and the arm is hung with an inclination in the same direction. As the chamber fills with sewage, the ball (which swings clear away from the bottom) is floated until it meets the face of the inlet-pipe, closing it to any back-wash. Mr. Dyer also shows his air-tight manhole-cover, and a galvanized-iron range-boiler, of a type familiar to our American readers, but made of several sheets instead of one for the shell, as in the States.

Francis Botting, 6 Baker Street, London (stand 658), shows gas-cooking apparatus, air-tight covers, etc.

Martineau & Smith, Holloway Head, Birmingham (stand 632), exhibit a variety of plumbers' brass-work, white and other metal cocks, pressure and water gauges, lubricators, dead-weight safety-valves, stand-pipes, and apparatus for fire extinction.

EAST CENTRAL GALLERY B—MATERIALS FOR SANITARY WORK.

Stand 459 is the exhibit of R. Anderson & Co., of Duke Street, Liverpool, in which is a variety of brass-work for water, such as is made for the Liverpool Corporation Water-Works and for use in connection with that city's water distribution. There are also some copper range-boilers, or hot-water tanks, pumps, etc. This firm also exhibits at stand , Eastern Annex, a tilting-cistern, the invention of Mr. J. B. McCallum, Borough Engineer of Blackburn. It is intended for a flushing-cistern. A tap extends through the side of the outer cistern over the inside tilting-tank when the inside tank is full, and tilts over, discharging its contents. This motion closes the cock, which is opened when the tilting-basin returns to its natural position. The supply-cock has a weighted lever to hold it open until the water in the inside tank is sufficient to tilt it forward a little and overcome the weight on the lever, thus closing the trap, all but a small dribble, which fills the tilting-tank after a certain period of time, thus securing a periodical flush of a measured amount of water. By an arrangement of chains and levers this tank is also made to flush only when closet is used. The tilting-tank fills while the seat is occupied; when the seat is relieved of weight a stop is removed from the tilting-tank, which tilts over, discharging its contents.

(TO BE CONTINUED.)

THE fifth annual meeting of the American Society of Mechanical Engineers will be held in the city of New York during the week beginning November 2, 1884.

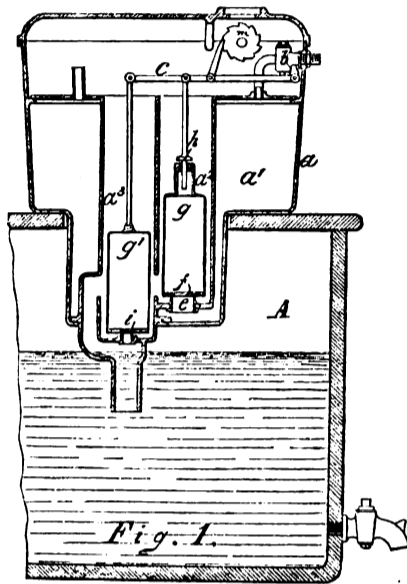
THE number of deaths from cholera in France, from the outbreak of the epidemic to August 23, was 3,952.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

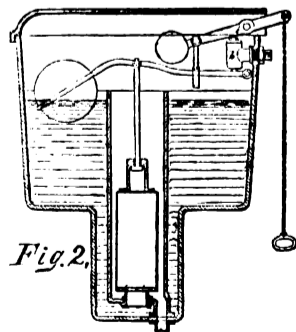
FLUSHING-TANKS.

OUR illustrations Figs. 1 and 2 represent novel apparatuses for measuring and controlling the flow of liquids. Figure 1 is intended to be automatic and to be used for flushing sewers, etc., periodically, the duration of the period to be fixed. Figure 2 is intended for use in water-closets or where the period is arbitrary.



The action of Fig. 1 is as follows: When the controlling valve *f* rests on its seat, the inlet-valve *b* is open, so that the liquid can enter freely into the measuring-chamber *a*¹; but, when this chamber is full, the valve *f* (which is so weighted that it will not rise from its seat till subjected to the pressure due to the proper head of water) opens and allows the liquid to flow through the tube *e* into the compartment *a*², and thence through the aperture into the compartment *a*³. The liquid acting upon the valve *f* raises the same until it comes against the collar *h*; the liquid then enters the chambers *a*², *a*³, and acting upon the floats *g*, *g*¹, raises the lever *c* and closes the admission-valve *b*, at the same time actuating a registering apparatus if used as a meter. When the controlling-valve *f* has risen from its seat, its buoyancy keeps it up while the water in the measuring chamber *a*¹, that is, the quantity to be measured at each operation of the valve, flows from the measuring chamber *a*¹ through the cylindrical compartments *a*², *a*³, from the latter of which it is discharged through the apertures *j* and *k*. The valve *f* is then closed by gravity.

It will be understood by referring to the diagram that the valve *f* will close before the valve *i*, because, when the water in the chamber *a*² has descended as far as the valve-seat *e*, there will still be sufficient water in the chamber *a*³ to hold up the valve *i*. The valve *f* will, by this means, close before the valve *b* is again opened.



It is preferable to place the measuring apparatus in a cistern or tank, A, in such a position that when the cistern is filled to a certain height the action of the apparatus will be prevented until this level is reduced; in other words, when the water is at a sufficiently high level in the tank A, the valve *i* will be held up by the buoyancy of the float *g*¹ and

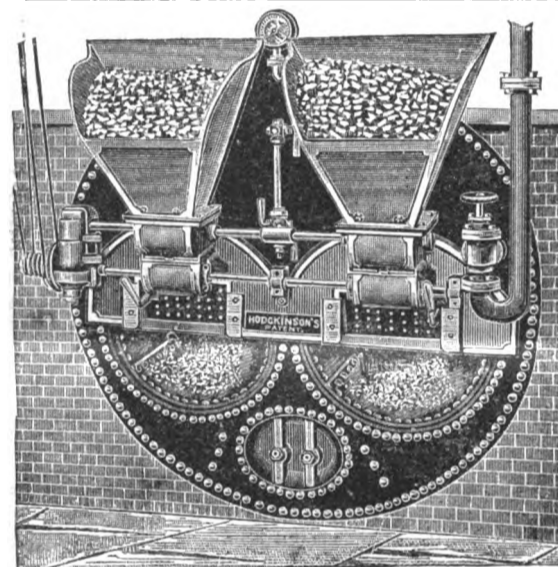
will keep the admission-valve *b* closed until the level of the water in the tank is sufficiently lowered to permit the valve *i* to fall and open the said admission-valve.

Figure 2 is for flushing water-closets, etc., by hand. The valve *f* is weighted in excess of the head of water to be used in the cistern, so it cannot be raised by the upward pressure. When it is properly set the float closes the ball-cock when the water is nearly level with the top of the tube. If the chain is now pulled down, the link on the weighted lever engages the float-lever, and taking up the remaining slackness between the float-valve and the rod *h*, the valve is opened and remains open as long as there is sufficient water in the tube to float it. The valve then returns to its seat and the opening of the ball-cock fills the cistern.

The apparatuses are the invention of Mr. Frederick Baker Hill, of New Cross, in the County of Surrey, England.

A NEW MECHANICAL STOKER.

WE take from the *Engineer* the accompanying illustration of what we believe to be a novel mechanical stoker, though in general outside appearance it resembles one made in this country. The general arrangement of it is: A large hopper for the reception of the coal to be fed into the bars stands well up, its top being about level with the top of the boiler, or, if necessary, higher still; at its mouth is a slowly revolving rose, which makes about three revolutions in two minutes, and which keeps the coal agitated, and feeds it uniformly into the lower drum. The interior of



this lower drum is fitted with a revolving boss, on the periphery of which two fans or webs are cast, the duty of which is to send the coal on to the bars; these fans or webs are curved convexly to the direction of their revolutions. The exact curve has been arrived at by experiment, and is so made to scatter the coals along the sides as well as the centre of the furnace. A fast running shaft, with a series of graduated pulleys, passes through this boss, which can be driven as occasion demands at any speed from 100 to 500 or 600 per minute, 200 having been found to be the best speed, as at that it spreads the coal well without knocking it into dust. The shafts are driven from the pulleys at the side of the machine; the arrangement of speeds—one very slow, the other very quick—being effected by means of worm wheels on a small vertical shaft at the side. Below the feeding-drum a fire-door is fitted for the convenience of cleansing fires, examining the furnace, or, if necessary, for allowing of hand-stoking. It will be understood that the coal is sent into the fire like hail; that a level fire is maintained, as thick or as thin as is desirable; that in consequence of the "hailing" of the coal a more perfect combustion of the fuel is expected, and that smoke is, as a result, to a greater extent consumed. The whole machine is hung by means of brackets and T-bolts from the top of the boiler, and the necessity to drill holes in the front plate is obviated, as well as the evil of having a heavy piece of mechanism with full hoppers of coal hanging from a plate already fully loaded, with the steam pressure on the other side of it.

It is the invention of Mr. Hodgkinson, of the Orsdeal Machine Works, Salford, England.

MR. W. F. LOWE, in a letter to the *Analyst*, reports that he recently examined a sample of flour, which contained copper equivalent to 16¼ grms. of the crystallized sulphate per four pounds of flour.

Reviews of Books.

PRINCIPES TECHNIQUES D'ASSAINISSEMENT DES VILLES AND HABITATIONS. Par A. Wazon. 364 pp. 8vo. Paris: Baudry et Cie, 1883.

This book contains a series of studies upon the water-supply, house-drainage, and sewerage of Paris, by a civil engineer who has evidently carefully studied the American and English modern literature upon these subjects, and although the author obviously labors under the disadvantage of not having seen some of the appliances which he describes, he has succeeded in preparing a very excellent treatise upon municipal sanitary engineering.

To American and English readers the chief interest of the book consists in its descriptions of the present condition of things in Paris, and in the historical data with regard to works of water-supply and sewerage.

The present population of Paris is estimated at 2,220,000. The present water-supply is given as 370,000 cubic metres per day, or about thirty-eight U. S. gallons per head, an amount at all times insufficient, and occasionally, as in 1881 and 1882, becoming so scanty as to create great danger of a water famine.

M. Wazon fixes the proper amount to be supplied to a large city for all purposes at one cubic metre, or about 220 gallons, per head per day, so that Paris will soon require a supply of 2,500,000 cubic metres per day. He considers that Marseilles is the only city in France which has a satisfactory water-supply, the quantity being one cubic metre per day for each of its 360,000 inhabitants.

Paris has 30,000 wells, the water from which is very hard and much contaminated with organic matters.

There are very few cisterns, and the chief reason given for this by the author is that the tenants of the attics and mansards are so accustomed to dispose of their chamber slops by the roofs, that it would be impossible to collect the rain-water without great risk of its containing offensive matters. M. Wazon lays stress on the contamination of the wells in certain parts of the city by leachings from the cemeteries, and in proof of the dangers from this source cites an epidemic of diphtheria in a school near the Montparnasse cemetery, and also says that the deaths from this disease in 1880 and 1881 group remarkably on the main drainage lines from the Cemetery Père Lachaise.

The description of the various aqueducts of supply for the city is interesting historically, the aqueduct of Arneil dating from 300 A. D.

The author recommends the river Loire as the chief source of the future water-supply of Paris, and very properly insists that this supply should be brought in a covered aqueduct, and not in an open canal to be used for purposes of transportation. One of the present sources of supply of the city—that of the Ourcq—is a canal of this last sort, and the water should be used only for street-cleansing and sewer-flushing. With the present insufficient amount of supply the use of storage-cisterns in each house is a necessity. The author points out the well-known inconveniences and dangers of such cisterns, as usually located in the attic beneath the roof, and recommends in their place storage-cylinders to be placed in the cellar, from which the water is to be lifted to the upper part of the house by the force of the air compressed in the upper part of the cylinders by the pressure from the street main. This apparatus, devised by Carré, undoubtedly presents certain advantages over the open cistern located above, but it is more expensive, and very much more liable to get out of order.

M. Wazon lays more stress upon the possible dangers from the use of lead pipe in house-piping for water-supply, both hot and cold, than we are accustomed to do in this country. The danger of lead-poisoning from this cause varies, of course, with different waters, and it is in many cases impossible to predict with accuracy the effect which a given water will have on lead pipes containing it.

The descriptions of water-closets and methods of house-drainage are full and include the best English and American plans. The author deserves great credit for the care and thoroughness with which he has examined the English and American literature of sanitary engineering, and for the fullness and accuracy of his references; indeed, we know of no foreign work which approaches it in this respect.

The total quantity of the garbage and street refuse which is removed daily from Paris is given as 2,000 cubic metres, or about 54,000 cubic feet; 600 carts are employed in this work, and the cost for the year 1880 was about one million of dollars.

The description of the sewerage of the city is full and interesting, and the discussion of the various methods which

have been proposed for the construction, flushing, and ventilation of sewers is an excellent presentation of the subject. The Frankfort system is mentioned with special approval.

With regard to the various methods which have been proposed for the purification of sewage, so that the effluent may be permitted to pass into running streams, M. Wazon concludes that no merely chemical process which has yet been devised is satisfactory, and that the most thorough purification is to be obtained by the system of intermittent downward filtration, which, however, is expensive, and cannot be expected to repay its cost. He concludes that sewage-irrigation for agricultural purposes is the only satisfactory method of disposing of the sewage of Paris, and that there is no reason to suppose that this will give rise to any danger to the public health.

We take great pleasure in commending this book to our readers, and while the words of Pasteur, which the author takes for his motto—viz., "it is within human power to extirpate parasitic diseases," is perhaps in need of qualification, there can be no doubt that it indicates the true principle which should guide efforts at securing municipal sanitation.

VACCINATION: Its necessity, control, efficiency, and safety. Prepared by Eugene Foster, M. D. 54 pp. 8vo. Concord, 1884.

This is the report of the Committee of the American Public Health Association on Compulsory Vaccination, and is reprinted from the transactions of the association for the New Hampshire State Board of Health. It is a carefully prepared document, including a large amount of information drawn from widely different sources, and its preparation must have required no small amount of time and labor.

As regards compulsory vaccination, the committee report that while they believe it to be just and necessary where large numbers of a community are unvaccinated, and are threatened with small-pox, they do not believe that it could be enforced in all communities, for the following reasons:

"I. The masses of the people are not yet sufficiently well informed to understand the necessity for vaccination. A law framed to protect a people against the probability of the occurrence of disease must not be too far in advance of their comprehension, or it will meet with opposition.

"II. Without desiring to disparage the medical profession, we must say that too many of its members are shamefully negligent in teaching the people their duty of protecting themselves and their helpless dependents, by availing of the benefits of vaccination. Some physicians are not sufficiently versed, either in the history or the practice of vaccination, to enable them to form a deep-settled conviction of the necessity for the measure, except in communities imminently threatened with an epidemic of small-pox. To the honor of the medical profession, be it said, that it has been the bulwark of the people in protecting them against small-pox, and its members have had to bear the false and malicious insinuations and charges so freely heaped upon them by anti-vaccinists. We point with pride to the fact that the most learned, conscientious, and humane physicians in all countries are unanimous in supporting the cause of vaccination.

"III. Knowledge of human nature leads us to know that the threatening of an outbreak of small-pox is, as a rule, an effectual means to make vaccination general. The person who would willfully and imprudently defy the public vaccinator when there was no small-pox near him, would gladly seek his aid if the disease was next door to him.

"IV. In our judgment compulsory vaccination laws would fail to a very great extent in this country at the present time in accomplishing the ends in view in their enactment, until the public health service in the various municipalities and States is organized upon a higher plane, which shall enable every board of health to operate a fully equipped vaccination service."

The larger part of the report is devoted to replying to the arguments of the anti-vaccination seekers for notoriety, and being statistical does not admit of condensation.

For use among the people a few graphic charts, showing at a glance the relative mortality from small-pox in various countries before and after the introduction of vaccination, are the most effective arguments, because the great majority of men can understand such diagrams much easier, and will remember the lessons they convey far more vividly than they will the same data given in the form of tables of figures. The report before us does not contain such charts, but it contains the data from which they can be made.

The New Hampshire State Board of Health has acted wisely in having this paper reprinted for its use, and we hope it will be widely distributed.

ELEVENTH ANNUAL REPORT OF THE BOARD OF HEALTH OF THE CITY OF NEW HAVEN. 1883. 63 pp. 8vo. New Haven, 1884.

Professor Brewer, the President of the Board, in his letter transmitting the reports of the Health Officer and Clerk of the Board, remarks very truly that the natural advantages of soil, climate, etc., with which New Haven is favored, have a tendency to retard sanitary reform, as without a pestilence or unusual sickness changes are apt to be deferred. He then says: "It is a law of nature that as the population of a city becomes larger, and the occupation of the soil denser, sickness and death increases faster than the population does, and in all previous centuries this has checked the rapid growth of cities and prevented their attaining a size such as we now see." If the cities have been prevented from attaining that size, how is it that we see the size aforesaid? And if sickness and death increase faster than the population, how does the city attain any size whatever? The rest of Professor Brewer's argument is, however, sound. He asks for a plumbing and house-drainage law, with the means of enforcing it, a law forbidding the building of any privies or cesspools on sewered streets, and also that the numerous hog-pens within the city limits may be abolished, and urges that there is the same necessity for such laws as for fire laws. "The landlord of the tenement-house is compelled, by law, to guard against certain dangers to the lives of his tenants from the occasional and accidental fire, but the law still allows the landlord to constantly endanger the life of the same tenant, in that same house, by such insanitary conditions that he is sometimes killed as the natural consequence, a remedy for which is as well understood and is no more expensive than the remedies against danger from fire. We want the authority and the means to use these remedies."

The report of the Health Officer, Dr. C. A. Lindsley, contains an interesting set of tables of the vital statistics of the city for the year. Measles and whooping-cough were prevalent in the early part of the year, as appears from the fact that during the first three months the number of children absent from the public schools for two days or more in each month, chiefly on account of these diseases, was more than 25 per cent. of the usual attendance, and in several schools over 50 per cent., while at a later period the number absent for two days or more in each month was 11 per cent. The death-rate in the different wards of the city varied from 12 to 21 per thousand, and Dr. Lindsley rightly calls special attention to this fact, and to the indications for sanitary work which it affords. "Those people take a very narrow-minded and limited view of the subject who regard the fact that there are in New Haven one or more seriously insanitary districts as a matter of merely local importance. It is far more than that. The influences reach out from those plague-spots into all other parts of the city with damaging effect. * * * If the people in any district or section are afflicted continuously with an excessive mortality, it implies excessive sickness and suffering; it implies discouragement, and poverty, and want; it implies domestic unhappiness and wrecked families; it implies fuller orphan asylums, poor-houses, and jails; and it applies what the rich can more readily appreciate—higher taxes."

Dr. Lindsley strongly recommends legislation to secure the registration of plumbers, the prohibition of cesspools on sewered streets, the official supervision of plumbing, the abolition of hog-pens, and the better protection of tenants in tenement-houses. The entire document is one of more than local interest, and we commend it to all municipal sanitary officers as one of the best of this class of reports.

HEALTH OFFICER'S ANNUAL REPORT OF BIRTHS, MARRIAGES, AND DEATHS, for the City of Philadelphia. 1882. 223 pp. 8vo. Philadelphia, 1883.

The first table in this report shows the death-rate of Philadelphia for the last twenty-two years, from which it would appear that the lowest annual mortality-rate during that period was in 1879, when it was 17.17 per 1,000. Unfortunately, the compiler of this table did not think it worth while to compute the true population of the city, which he might easily have done, and accepted the estimates for each year made in that year.

The result is, that the population for 1877, 1878 and 1879 is reported larger than in 1880, for which year the census figures are taken, and the mortality-rates for these years are given as much lower than they really were. The mortality for 1882 is given as 22.62 per 1,000.

The tables showing deaths by causes, by ages, by wards, etc., are elaborate and extensive, and furnish the means for a number of interesting statistical comparisons. In an appendix are given some miscellaneous statistics, from which we extract the following: The area of the city is 129.45 square miles, or 82,848 acres. It has 900 miles of paved streets, 200 miles of sewers, 750 miles of water-pipe, and 732 miles of gas-pipe. There are twenty miles of river-front on the Delaware and sixteen miles on the Schuylkill.

The volume is one that will be found interesting and valuable by statisticians.

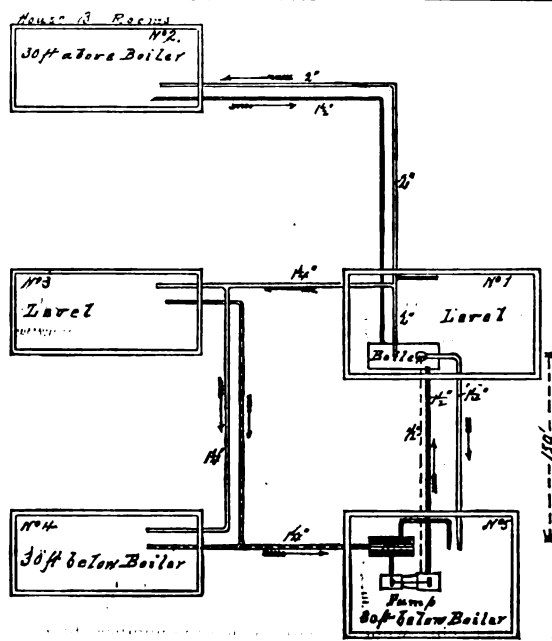
Correspondence.

STEAM-TRAPS.

STAUNTON, VA., August 4, 1884.

To the Editor of THE SANITARY ENGINEER:

I COME to you once more with one of my sketches, which I hope you will be able to understand. I happened to see this job a few days ago, and remarked it could never be made to work. Last winter there was an Albany steam-trap over the boiler in house No. 1, and it done all that was claimed for it, but the parties who own the house said it required too much steam to run the trap, as it made the rooms in house No. 1 too hot in moderate weather; so they consulted a "jack-of-all-trades," who has advised the present plan. The bath-boiler (R), forty gallons, is intended to receive all the condense from houses Nos. 3, 4, and 5. Not less than 3,000 feet of pipe (1-inch). Then the Knowles pump is intended to pump the water back into the boiler.



There is no way to cool the water in the bath-boiler, and no way to get rid of the steam. Now, I wish to know if there is any pump that will work boiling water or steam. When the party started the pump it would not work, and he said it was because the pump was too small, and he ordered a larger one. You will notice houses Nos. 1 and 2 are of the return-system or low-pressure, while the other three will be high-pressure, and I think very high-pressure, as the pump is 30 feet lower and 150 feet away from the main steam-boiler. There is no safety-valve on the bath-boiler. Is there not danger of this boiler blowing up? It is in a cold place, and steam is not kept on it at night in the winter. There is all necessary valves on the pipes, though they are not shown. The Knowles pump is No. 00, with $\frac{3}{4}$ -inch suction and $\frac{3}{8}$ -inch steam and $\frac{1}{2}$ -inch discharge, increased two feet from pump to $1\frac{1}{2}$ -inch. If you can understand this, I will be glad if you will publish in full, with cuts, just what you think of the job. By so doing you will oblige, Respectfully, C. BARGAMIN.

[If you mean when you say the Albany trap "did all that was claimed for it," that the apparatus heated and circulated properly, regardless of making the rooms too warm at times, we are of opinion that a great mistake was made when it was removed.]

The graduation of temperature of steam-radiators to suit changes of the weather is something that has been indifferently accomplished by the best engineers in the trade heretofore, and is not to be expected with such an apparatus as you describe. When an apparatus will work properly with any pressure, let it be one or forty pounds, then a good way is to carry low pressures in moderate weather, and higher pressures as it grows colder.

Speaking of the steam required to run the "Albany" or "Pratt" trap, or any gravity-trap, we think it is a mistake on this score to use a pump instead, which exhausts to atmosphere. Assuming the surface of the ball of such a trap to have seven square feet of condensing, it will condense less than three pounds of steam per hour, which is about one-tenth of a horse-power, and to do this it is capable of pulling about 720 pounds of water back into the boiler, regardless of pressure, whereas a pump to do the same requires nearly the steam of one horse-power, unless the exhaust-steam is turned into the heating-apparatus, which, of course, can only be done to advantage with low pressure in the pipes, when pump and trap are brought on about the same level, in point of duty.

A 40-gallon bath-boiler appears small for the purpose of a receiver for a pump, but should the pump be kept in

constant action it will do, though if we designed a receiver for such a place we would proportion it to hold the condensed water that could be formed in an hour to that much time for an examination of the pump, etc. A galvanized-iron bath-boiler (if it is such that is used) will not burst with sixty pounds pressure, though, again, we must say we would not select it for a receiver. If the pump is sufficiently low to allow the hot water to flow into it by gravity from the bath-boiler (receiver), it should pump hot water. A pump is capable of forcing hot water, but will not "suck" it when it is near the atmospheric boiling point. The reason, presumably, the pump does not work well is, there is too great a loss of pressure in 150 feet of $\frac{1}{2}$ -inch pipe from the boiler. We would suggest a one-inch pipe for the pump used.

We are opposed to giving an expression of opinion on the general methods of work—if they are not dangerous to life and limb—all the circumstances of which we cannot be acquainted with.]

SUBSOIL-IRRIGATION.

NEW YORK, August 14, 1884.

To the Editor of THE SANITARY ENGINEER:

IN Mr. T. M. Clark's "Building Superintendence," page 207, *et seq.*, is a description of subsoil-irrigation, in which it appears the two parts necessary to the system are a tight cesspool and the network of pipes. In the drawing of the cesspool the outlet-pipe is shown some distance above the bottom of the tank and without a syphon. It would seem that by this arrangement a constant, instead of an intermittent, discharge would obtain, and also that the cesspool would shortly become a source of disease. In Mr. William Paul Gerhard's "Hints on the Drainage and Sewerage of Dwellings," page 285, *et seq.*, is also a description of the same system, but with the important addition, to my mind, of an apparatus for automatically and intermittently discharging into the absorption tiles. Do you think Mr. Clark's method can be worked satisfactorily, and where can the flush-tanks and data for applying the system be obtained? An answer will oblige,

Yours truly, GEORGE MARTIN HUSS.

[The apparatus recommended by Mr. Clark is an inexpensive and simple one, but inferior to the one described by Mr. Gerhard with the intermittent discharge. The more simple apparatus is, however, vastly better than the common practice of soaking away the sewage through a porous cesspool, and we recommend it to all who cannot afford the syphon or gate. But parties who use it must expect to find the distribution-pipes choked occasionally and must then take them up and clean them out. The intermittent discharge insures immunity from this annoyance for a much longer period.]

The flush-tanks are generally made by a mason, with brick and cement, and the syphon, etc., constructed with soil-pipes.]

DISCHARGE INTO VENT-PIPE.

MANKATO, MINN., August 16, 1884.

To the Editor of THE SANITARY ENGINEER:

I HAVE had a case of plumbing brought to my notice, where the pipe from a sink stopped up between the trap and the soil-pipe. How long it had been so no one seemed to know, as the water that should have passed down the waste-pipe passed over through the vent-pipe, and found its way into the soil-pipe through the vent-drip. What is the usual way in your city to prevent this? An early answer will oblige, Yours truly, COUNTRY PLUMBER.

[When the vent and soil-pipes are carried in a recess back or near the sink, introduce your Y-branch into the vertical line of vent-pipe, half-way between the bottom and the upper edge of the sink, or other fixture. This will cause the water to show in the sink should the waste-pipe be stopped beyond the trap, but will not allow the sink to run over.]

If the pipes are all below the floor, the diagram shows how it may be accomplished. Arch the vent-pipe up behind the sink, as per dotted lines, sufficiently high to raise water into the bottom of the sink, but not high enough to run over.]

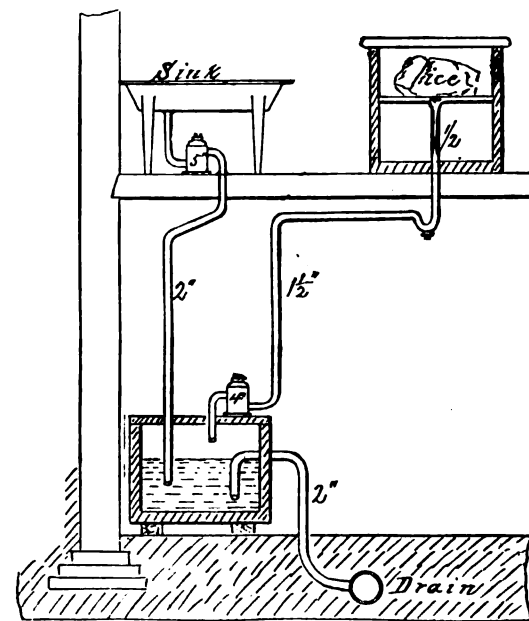
A MULTIPLICATION OF TRAPS.

WORCESTER, August 18, 1884.

To the Editor of THE SANITARY ENGINEER:

I SEND you a sketch of some plumbing-work which came under my notice recently, as it was being overhauled. Originally the drum-trap at kitchen sink connected directly by a 2-inch pipe with the 6-inch earthenware drain below cellar floor. The refrigerator-trap also connected to drain by a $1\frac{1}{2}$ -inch pipe. Neither trap was ventilated. This latter was soon disconnected and made to discharge in an open pail, which was emptied every day. Eventually the house-drain becoming clogged with grease, the plumber advised putting in a grease-trap. This sketch shows the result of his labor. Not only did he put a grease-trap (not ventilated)

on the sink-waste, but also added a drum-trap to the refrigerator-waste and discharged it into the grease-trap. This job has just been overhauled, a 4-inch vent carried from



grease trap to roof, and an open tray put on the line of refrigerator-waste, so as to entirely disconnect it.

Yours sincerely, A CONSTANT READER.

[The multiplication of traps with air-bound spaces between them here shown, is a flagrant case of stupidity. There should be no such duplication of traps allowed. The better way is to terminate the wastes that deliver into the grease-trap above the water-line.]

WARMING THE AIR OF ROOMS WITH GAS.

MACON, GEO., August 18, 1884.

To the Editor of THE SANITARY ENGINEER:

CAN you tell me what temperature will be maintained in a chamber 10'x10'x8'6", by burning 100 6-foot flat-flame burners with common gas? There are four flues, each twelve inches in diameter, opening into the lower part of the chamber, and one outlet above, thirty inches in diameter. Yours truly, B.

[The average thermal value of a cubic foot of common gas is about 500 heat-units, and each heat-unit will warm 48 cubic feet of air one degree. Therefore, if you burn 600 cubic feet of gas in an hour, it is equivalent to warming 14,400,000 cubic feet of air one degree. If now we assume the velocity in your inlet-flues to be five feet per second (the aggregate areas being 3.14 square feet), the rise in temperature from that of the outside atmosphere—whatever it may be—can be no more than 25.65° Fah. In other words, if your flues will pass 565,200 cubic feet of air in an hour, the entering air being 40° Fah., the temperature at the register will be 65.65° Fah., provided there is no loss of heat elsewhere.]

Of course it will be apparent to you from this that should the velocity in the flues be ten feet per second, the rise of temperature of so much air will be but 11.82° Fah., and that, on the other hand, should the velocity be 2.5 feet per second, a rise of 51.30° may be expected.]

THE Edson Steam Pressure-Gauge Co., of New York, has lately appealed to the Secretary of the Treasury from the decision of the Board of Supervising Inspectors of Steamboats, claiming that its recording-gauge fulfills the requirements of section 4,418 of the Revised Statutes, that provides that all steam vessels should have "suitable steam-registers that will correctly record each excess of steam carried above the prescribed limit and the highest point attained."

The board rejects the Edson register on the ground that Sec. 4,419 of the Revised Statutes provides that "the steam-registers shall be taken wholly from the control of all persons engaged in the navigation of such vessels," and that the Edson register, although it is synchronous, from the fact of its requiring to be wound up, will not comply with the law. But in its decision it seems to lose sight of the fact that the section quoted is evidently not obligatory, and certainly ambiguous, as it appears to leave it to the option of the local inspectors, the same as it is with a lock-up safety-valve.

As it is, we believe the provision of the statutes which provides for recording-gauges cannot be carried out, as there is no gauge which meets the views of the Supervising Inspectors.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING AUGUST 16, 1884.

(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.		ACUTE LUNG DISEASES.					Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.	
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.					
NORTH ATLANTIC CITIES.																								
Portland, Maine.	35,000	15	22.8	8	53.3	1		1	2	5													1	
Boston, Mass.	435,000	196	28.4	99	50.5	7	1	14		50	2	1	6		3	5		3			1		8	
Lowell, Mass.	71,500	25	18.2	13	52.0			1		4			1		1									
Worcester, Mass.	69,000	31	28.4	12	38.7	1				9	1					2		1			1		1	
Fall River, Mass.	67,000	30	33.8	25	63.3	1				14	1													
New Haven, Conn.	69,500	29	21.7	13	44.8			4		4			1										1	
Providence, R. I.	125,000	47	19.5	26	55.3	1		12	1	14	1		1										1	
Total.	872,000	373	22.2	196	52.5	11	1	32	3	100	5	1	9		4	7	1	4			2		12	
EASTERN CITIES.																								
Albany, New York.	103,000	40	20.2	11	27.5	4		8		3			2			3	1							
New York, New York.	1,355,000	657	25.2	340	51.7	24	3	84	11	154	16	5	5	10	2	33	1	14		12	7		13	
Brooklyn, New York.	670,000	299	28.2	174	58.1	8		21	1	89	4		2	2	2	12	2	4	2	2	5		15	
Hudson County, New Jersey.	225,000	80	18.5	41	51.2	2	1	9	1	12	3		2		2	1		2						
Newark, New Jersey.	225,000	80	18.5	41	51.2	2	1	9	1	12	3		2		2	1		2						
Philadelphia, Pa.	940,000	392	21.7	195	49.7	15	2	33	7	64	5		12		5	10	4	5		1	3	1	6	
Wilmington, Delaware.	50,000	28	29.1	17	60.7			3		10	1		2		1								1	
Total.	3,343,000	1,496	23.8	778	52.0	53	6	158	20	332	29	5	25	12	12	59	7	25	2	15	17	1	35	
LAKE CITIES.																								
Buffalo, New York.	105,000	37	18.3	23	62.1		2	1		12						1	2	2			2			
Rochester, New York.	105,000	37	18.3	23	62.1		2	1		12						1	2	2			2			
Cleveland, Ohio.	210,000	72	17.8	47	65.2		7	1		24	1		2	1		2	1		1	4	1		3	
Detroit, Michigan.	140,000	91	35.8	51	56.0		5	1		24	7	1	4	1	1	2	1				1			
Chicago, Illinois.	650,000	243	19.4	154	63.3	5	1	12	3	66	3		5	3	5	8	2	3		8	1		2	
Milwaukee, Wisconsin.	147,000	81	28.7	66	81.4			5		39			1			1				1	1		2	
Total.	1,252,000	524	21.8	341	65.0	5	3	30	4	165	11	1	12	5	6	14	5	5	1	13	4		7	
RIVER CITIES.																								
Pittsburg, Pa.	210,000	94	28.8	55	58.5	7		4		20	9				1	1	6			1			4	
Cincinnati, Ohio.	275,600	103	19.4	50	48.5	4	2	13		20	1					5		2					1	
Minneapolis, Minn.	100,000	48	25.0	26	54.1	4		4	2	19	2		4			2					1			
Louisville, Ky.	137,000	67	25.4	22	32.6		1	11	1	2			5										1	
Indianapolis, Ind.	94,000	42	28.2	16	38.0	3		3		1			1	2			1	1			1			
Evansville, Ind.	34,000	21	32.1	11	52.3		1	1		3			2								1			
St. Louis, Mo.	375,000	177	24.5	79	44.0	7		20		30	4	1	11	10	4	2	4	6		2			2	
Total.	1,225,600	552	28.4	259	46.9	25	5	56	3	95	16	1	23	13	5	15	7	10		3	3		8	
SOUTHERN CITIES.																								
District of Columbia.	133,800	60	23.3	35	58.3	2		6		15			2	1	2	1							1	
Richmond, Va.	60,900	42	31.5	20	47.6	8		4		11				1	1	1							1	
Charleston, S. C.	41,000	13	16.5	6	46.1			2		1														
Atlanta, Geo.	32,400	22	35.3	8	36.8			2		2			3											
Augusta, Geo.	25,000	14	28.1	5	35.7	1	1	1								1	1							
Savannah, Geo.	27,900	20	37.4	11	55.0	1		1		5						1				1	1			
Nashville, Tenn.	24,000	6	19.0	1	16.6																			
New Orleans, La.	17,000	7	21.4	3	42.8	2		1																
Memphis, Tenn.	35,100	13	19.2	8	61.5	1				2	3													
Mobile, Ala.	31,800	11	26.9	5	45.4					2											1			
San Antonio, Tex.	17,000	63	27.2	22	34.9	1		11		3			4	1	1	8		1					1	
Total White.	429,900	160	20.4	77	45.5	7	1	22		21	3	1	3	7	3	2	2	1		1	2		1	
Total Colored.	280,800	185	30.4	59	48.7	4		14		18	1		3	8	1	5		1		1	2		2	
Total in 31 U. S. Cities.	7,353,300	3,249	28.0	1,710	52.6	105	16	312	30	731	65	9	75	40	31	102	22	46	3	32	28	1	65	
August 2.	Total in 28 English Cities.	8,762,354	3,509	23.8		125				689	21		48		74						109		18	76
" 2.	" 8 Scottish Cities.	1,254,607	498	20.6		19				40	2		3		11						16			23
" 2.	" 16 Irish Cities.	858,660	341	20.7		9				20			5		8									
" 2.	" 139 German Cities.																							
" 2.	" 15 Swiss Cities.	455,537	169	19.8		14				48	3		8								1	1	1	1

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending August 16, 1884, in 31 cities of the United States, with an aggregate population of 7,353,300, there died 3,249 persons, which is equivalent to an annual death-rate of 23.0 per 1,000. In the North Atlantic cities the rate was 22.2 per 1,000; in the Eastern cities, 23.3; in the Lake cities, 21.8; in the River cities, 23.4, and in the Southern cities, for the whites 20.4, and for the colored 30.4 per 1,000. The deaths under 5 years of age were 52.6 per cent. of the total mortality, the proportion being highest in the Lake cities—viz., 65.0 per cent.

Accidents caused 3.2, consumption 9.6, diarrheal diseases 22.4, and diphtheria 2.0 per cent. of the total mortality. Diarrheal diseases caused in the North Atlantic cities, 26.8; in the Eastern, 22.1; in the Lake, 31.4; in the River, 17.2, and in the Southern cities, for the whites 12.4, and for the colored 13.3 per cent. of all deaths. Typhoid fever caused 2.3, malarial fever 1.2, scarlet fever 0.9, pneumonia 3.1, measles 0.9, and puerperal diseases 0.8 per cent. of all deaths. The percentage from whooping-cough was 2.0, and was highest in the North Atlantic cities—viz., 3.2 per cent.

BOSTON, MASS.—C. E. Davis, Jr., reports 8 new cases of diphtheria, 50 of scarlet fever, and 20 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 21 new cases of diphtheria and 10 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 25 cases of scarlet fever and 6 of diphtheria under treatment August 16.

BALTIMORE, MD.—The weekly report of the Health Officer records 158 deaths, of which 79 were under 5 years of age. The annual death-rate for the whole population was 20.0 per 1,000; or 17.2 for the whites and 36.4 for the colored. Diphtheria caused 5 deaths, croup 1, scarlet fever 2, whooping-cough 3, malarial fevers 2, diarrheal diseases 21, consumption 19, and violence 8.

MASSACHUSETTS.—In 110 towns of the State, during the week ending August 5, there were 203 deaths from the principal zymotic diseases. Diarrheal diseases caused 152 deaths, whooping-cough 15, typhoid fever 9, scarlet fever 15, and measles 1. The highest death-rates recorded were 30.67 in Fall River and 33.77 in Salem.

DISTRICT OF COLUMBIA.—Dr. Townshend, in his report for the month of July, records 425 deaths, a decrease of 18 from the previous month. Of the decedents 223 were white and 202 colored, being equal respectively to death-rates 20.4 and 36.1 per 1,000. The rate for the whole population was 25.5, which is less by 6.1 than the mean of the corresponding months for the past 10 years. The deaths under 5 years number 185. Among the principal causes of death were diarrheal diseases 86, and consumption 69. Diphtheria caused 3 deaths, scarlet fever 6, whooping-cough 7, typhoid fever 7, malarial fever 6, and violence 22.

CHICAGO, ILL.—During the month of July there were 1,583 deaths, of which 1,111 were under 5 years of age. The number of deaths exceeds that of any correspond-

ing month for the past 4 years. The annual death-rate was 30.1 per 1,000. Diarrheal diseases caused 665 deaths, or about 40 per cent. of all deaths; diphtheria 31, croup 12, typhoid fever 22, malarial fevers 10, scarlet fever 20, measles 61, whooping-cough 10, consumption 80, puerperal diseases 12, and violence 46.

ENGLAND.—The annual death-rate in the 28 large towns of England and Wales during the week ending August 2, was 23.3 per 1,000. The highest rate, 34.6, was recorded in Preston; the lowest, 14.5, in Bristol. The highest annual death-rates from diarrheal diseases were 12.6 in Preston, 11.0 in Leicester, 7.1 in Salford, and 6.9 in Norwich. Small-pox caused 19 deaths in London, 2 in Liverpool, 2 in Hull, 2 in Sunderland, and 1 in Sheffield.

LONDON.—Births, 2,589; deaths, 1,767, the latter being equivalent to an annual death-rate of 22.9 per 1,000. The fatal cases of small-pox declined to 19, including 8 deaths in the Metropolitan Asylum Hospital. The number of patients in the hospitals declined to 937, and the number of new cases fell to 68. The deaths from diarrheal diseases and dysentery, which were 466 the previous week, declined to 301, but exceeded the corrected average by 30. There were 16 deaths also referred to choleraic diarrheal diseases and cholera. Measles caused 44 deaths, scarlet fever 31, diphtheria 16, whooping-cough 46, typhoid fever 17, consumption 171, and violence 57.

SCOTLAND.—During the week ending August 2, the annual death-rate in the 8 principal towns was 20.6 per 1,000. The lowest mortality rate was again in Perth; the highest in Glasgow, 24.4.

EDINBURGH.—Deaths, 75; annual death-rate, 15.8 per 1,000. Scarlet fever caused 2 deaths, whooping-cough 7, diarrheal diseases

RUSSIA—*St. Petersburg*.—July 13-19; Deaths, 537; annual death-rate, 30.1 per 1,000. Measles caused 17 deaths, scarlet fever 1, typhoid fever 16, diphtheria 11, whooping-cough 6, and diarrhoeal diseases 119.

DENMARK—*Copenhagen*.—July 23-29; Deaths, 117; annual death-rate, 22.8 per 1,000. Measles caused 4 deaths, croup 2, whooping-cough 4, typhoid fever 2, diarrhoeal diseases 26, consumption 9, and violence 2.

Association News.

WASHINGTON MASTER PLUMBERS.—The regular monthly meeting of the Association of Master Plumbers of Washington, D. C., was held on the evening of the 18th inst., President E. J. Hannan in the chair. The committee appointed at the last meeting to prepare a statement showing that the laying of pipes and repairing of hydrants could be done cheaper by the plumbers than as at present by the District employees, stated that in consequence of the illness of one of its number it was unable to report. The Secretary read a communication from the Executive Committee of the National Association of Master Plumbers, submitting a proposition to be signed by manufacturers and dealers in wrought-iron pipe and fittings, to make the difference in price between dealers and consumers $33\frac{1}{2}$ per cent. instead of 20 per cent. The Vice-President of the National Association for the District, Mr. E. J. Hannan, was instructed to present this agreement to the dealers and their agents in this city, and obtain their signatures. A letter was read from the Vice-President for Maryland, suggesting that an agreement be made by Baltimore and Washington plumbers with dealers to secure material 20 per cent. less than the prices to all other purchasers. Messrs. E. J. Hannan, R. G. Campbell, and James Ragan were appointed as a committee to confer with the Norfolk and Baltimore Associations, for the purpose of securing a uniform agreement with the dealers. After the transaction of some routine business the meeting adjourned.

THE CHICAGO MASTER PLUMBERS' ASSOCIATION met August 20, the heat and thunder-storm allowing a bare quorum, President Baggott presiding, and William B. Oliphant secretary. From the Apprentice Committee, Chairman J. J. Hamblin reported good progress in putting into practical shape the apprenticeship system indorsed by the National Association. Unanimous ballots made Tom Ennis and James Hanna members of the association. The Warehouse Committee made a report of some importance, and the position assumed was acceded to by the representative present of a lead-pipe company. Later, if the storm still howled, the black cat, now domesticated in the library, purred complacently, and euchre-decks were shuffled with skill.

NEW YORK MASTER PLUMBERS.—A regular meeting of the Association of Master Plumbers of New York City was held on the evening of the 22d inst., about twenty members present. The reply of the manufacturers and dealers to the propositions recently submitted by the association was discussed and laid on the table until September, when a larger attendance can be looked for.

BALTIMORE MASTER PLUMBERS' ASSOCIATION.—The regular meeting was held at Knapp's Hall, August 21. William H. Rothrock, first Vice-President, presided. Two new members were elected. The position of president being made vacant by the removal of John W. Bechtel from the city, Mr. William H. Rothrock was unanimously elected president, and D. B. Foster was elected as first vice-president.

MARYLAND SANITARY ASSOCIATION.—The Plumbers' Section of the Sanitary Association of the State of Maryland held a meeting on the evening of the 20th of August. Mr. William Dunnett presided, William H. Rothrock, secretary. A committee on permanent organization was appointed as follows: William H. Rothrock, James C. Thornton, James Millar, Jr., John F. McConell, and Wm. Dunnett, chairman; the committee to report at a meeting to be held Thursday, August 28. The Section requested all present to attend the convention of the State Board of Health, to be held at Blue Mountain Hotel, on September 15, 16, and 17.

THE annual meeting of the American Pharmaceutical Association is to be held in Milwaukee, Wis., commencing on Tuesday, August 26, and continuing four days. An unusually large attendance of Western druggists is expected, as the meetings for the past few years have been held in the East.

THE Second Sanitary Council of Maryland will be held at the Blue Mountain House, Western Maryland Railroad, Wednesday, Thursday, and Friday, September 17, 18, and 19, 1884.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Aug. 23.....	25.01	18.14	22.45	27.56	27.90	19.04

E. G. LOVE, Ph.D., *Gas Examiner.*

A MOVEMENT is on foot to have the electric-light introduced in Germantown, Pa.

THE stage of the Paris Opera House is lighted by the Edison incandescent-lamps.

PETITIONS are circulating in favor of the establishment of the Consumers' Gas Company in Reading, Pa.

THE Northern Liberties Gas Company, of Philadelphia, has reduced the price of gas to \$1.70 per thousand.

LARGE forces of men have begun laying pipe on the West Side, Chicago, for the new company, it being determined not to wait till next spring.

DEFIANCE, O., is partially lighted by sixty-one gasoline lights, furnished by the Belden Burner Co., of Canton, O., J. J. Schneider having charge of the work.

SAGINAW, MICH., is to be lighted by electricity. The Vandepoelle light has been adopted, and the city will pay \$25,000 for lighting the first year.

THE contract of Messrs. Siemens for lighting the town of Hull by electricity having expired, the Committee on Works of the Council resolved to introduce Sugg's burners, which has been done.

OTIS T. BENTON, representing Eastern capitalists, is organizing a water-gas company in Detroit. He proposes to have the new company ready for business before December 1, and guarantees that the price of gas shall not exceed \$1.35 per thousand feet.

THE *Gas Engineer*, commenting on the removal of the Jablochkoff electric-lights from the Thames Embankment, says: "Beyond the illumination of a few private establishments, the electric-light in London may be said to be *non est*."

THE English gas journals have of late devoted considerable space to a report of the legal proceedings in the case of Sugg vs. Bray. The hearing, which occupied fifteen days, has been closed, but the decision will not be rendered for some three or four months, or until after the vacation.

THE London Board of Trade has decided to revoke twenty-five of the provisional orders which were granted last year for the lighting of London by electricity. Twenty-three of these orders were granted to the Metropolitan Brush Electric-Light and Power Company, which has since gone into liquidation.

ACCORDING to Mr. William Richards, in the *Gas Engineer*, the furnace-bars in use at the Harrogate Gas-Works consist of two $1\frac{3}{4}$ -inch wrought-iron pipes, so arranged that a current of water passes through them continuously. These bars are said to last much longer than the ordinary cast-iron bars, and also prevent clinking.

PHILADELPHIA.—County Comptroller Hirst recently received an estimate from President Gardner, of the Gas Trust, of the expense of lighting the city in 1885. The total sum required was fixed at \$160,188.69, which was divided up as follows: Lighting, extinguishing, cleaning, and repairing 13,411 lamps, \$131,292.67; lighting, etc., 600 new lamps, \$2,937; lighting, etc., 200 lamps to be changed from gasoline to gas-lamps, \$1,958; erecting 600 new lamps, \$12,000; changing 200 gasoline to gas-lamps, \$2,000; repairs and renewals, \$10,000.

MR. F. T. LINTON, in his inaugural address before the North British Association of Gas Managers, calls attention to the fact that as yet little attention has been paid to devising a suitable standard burner, which would properly and fairly develop the illuminating value of the rich gas manufactured in Scotland. In speaking of the standard candle and of some experi-

ments conducted by Mr. Foulis upon candles of two different makers, he says: "The outcome as regards consumption of sperm per hour, was that the candles varied from 6.9 per cent. above to 6.1 per cent. below the standard; or a total variation of 13 per cent. As regards the time required to consume 40 grains of sperm, it ranged from 6.5 per cent. above to 6.5 per cent. below the standard; or a total variation of 13 per cent. Again, the candle-power of the same gas tested against the different candles experimented upon, showed a variation of 9.58 per cent., or nearly three candles." He also spoke very pleasantly of the electric-light, and thought we must honestly confess that it is largely due to the threatened competition of electric-lighting that our profession has been thoroughly roused to a condition of activity and progress.

IN March, 1883, Mr. Ellis Lever offered a prize of £500 for a new safety-lamp for miners' use. One condition of the prize was that the lamp should be "a perfectly self-contained electric-lamp, or other lamp, which the working miners can conveniently carry from place to place in the mine, which will continue to give a useful amount of light for not less than twelve hours, and which will not cause an explosion of gas under any circumstances at all likely to represent conditions which may occur in actual practice."

Another condition was that the prize should not be awarded to any lamp now in use.

The committee of five gentlemen appointed to examine the lamps and award the prize, examined 108 lamps, four of which were electric-lamps, and 104 were oil-lamps.

In its report the committee says, that "with respect to the electric-lamps, there was not one which fulfilled, or approached fulfillment of, the conditions of the award. All the lamps which fulfilled the preliminary requirements were submitted to a series of experiments of progressively increasing severity. These experiments, based upon the experience gained by the Royal Commission, and by experiments instituted by other bodies in this country, were calculated to fulfill even exceptional conditions to which lamps may be exposed in actual practice. While there was a considerable number of lamps which behaved satisfactorily under the normal conditions existing in mine workings, the number was reduced to a very few as the extreme tests were reached. Of these there is no one lamp that perfectly fulfills the whole of the conditions, and the adjudicators are consequently unable to make the award to any one of the lamps submitted."

Notes.

CONSTRUCTION.

THE Peck, Stow & Wilcox Manufacturing Co. has brought suit against the city of Meriden, Conn., for damages to the amount of \$25,000 for diversion of water from streams controlled by the company, thus reducing its water-power in dry seasons to such an extent as to compel it to put steam-power in its mills.

THE committee on water-works in Battle Creek, Mich., has decided to build a new reservoir 60'x12' and ten feet deep in the west end for fire protection.

THE contract for building the dam for water-works at West Brookfield, Mass., has been let to A. W. Smith, after plans of Emory C. Davis, C. E.

DEFIANCE, O.—Architect J. I. Hale has completed plans for a city hall, to cost about \$18,000. The contract for the building has just been let to John S. Demann and McClary & Son for \$15,650. The contract for heating is not yet let.

NEW LONDON, O.—Architect B. F. Zarker has completed plans for two dwellings, one for George Runion and the other for A. A. Powers, costing \$8,000 each.

LIMA, O.—The Allen County Court-House, at this place, under the superintendence of architect George B. F. Cooper, will be completed and ready for occupancy by September 1. The cost of the building is \$175,000; this includes the plumbing and steam-heating by A. C. Baxter, Jr., & Co., at \$10,000, the furniture from Conant Brothers, of Toledo, and the clock and bells from the Howard Watch and Clock Co., New York, \$3,000.

Architect W. H. Church has completed plans for an addition to the Baptist Church, to cost about \$5,000; also for a business block for Philip Klaus, to cost \$15,000.

THE Board of Health is looking sharp after parties who throw waste and foul matter into the Ottawa River that flows through the city. The river now is low and in a very insanitary condition, owing to refuse from the paper mills in the vicinity being emptied into it. It has been suggested that a sewer be built along the river, about a mile long, which may remedy the evil. This seems to be the only feasible way at present.

THE water-works nearly completed for the city of Holland, Mich., will cost \$25,000.

WELLESLEY, MASS.—A new reservoir is to be built, with a capacity of 1,000,000 gallons. The contract has been awarded to C. F. Dacey. Estimated cost, \$9,200.

REVERE, MASS.—Architect H. J. Preston, of Boston, is preparing plans for a building for the Revere Rubber Company, estimated to cost \$100,000.

WATERTOWN, MASS.—Architect H. J. Preston is preparing plans for a building for the Hull Rubber Company, estimated to cost \$10,000.

TOLEDO, O.—Plans will be made by Architect Bacon for a \$30,000 building to be used as a manufacturing establishment by Smith & Haldeman, elevator manufacturers. The owner will be Mr. D. R. Locke, of the *Toledo Blade*.

The same architect will also make plans for a building for Emerson & Co., wholesale grocers. The cost will be \$25,000 or upward.

Architects Gibbs & Stein have completed plans for a \$10,000 dwelling for Marcus Linas. Locke & Schultz will do the plumbing.

Architect A. Liebold has prepared plans for a dwelling, costing about \$5,000, for Mrs. A. Smith, on Fourteenth Street.

DETROIT, MICH.—A corporation known as the Peninsular Bridge Company has been organized, with W. K. Muir as President and F. F. Palms as Secretary. The company has applied to the Park Commissioners for the privilege of landing its bridge at some suitable point on Belle Isle, Detroit's island park, and to secure to the company, by lease or otherwise, the conveniences and privileges of a suitable approach to the landing. It is the intention of the company to lay across the Detroit River as soon as the necessary concessions can be secured.

A company is being formed for the erection of an observatory 250 feet high.

SAGINAW, MICH.—Anderson & Dawson have been awarded the contract for building the jail at Pontiac, Mich. The contract price is \$14,048.

PHILADELPHIA, PA.—Among the other department estimates submitted to the Controller for the year 1885, is that of the trustees of the gas-works of the city, who ask for \$160,188.69, which includes \$2,937 for 600 new lamps; erecting 600 new lamps, \$12,000, and \$10,000 for repairs and renewals.

The Chief Engineer of the Water Department is about to try the experiment of purifying the water supplied to the city by subjecting it to a course of aerification. The plan proposed is to subject a stream of the water as it passes through a main about 500 feet long, which runs from the pumps to the reservoir, to a charge of air which will be forced into the main by one of the turbine pumps, which will be altered into an air-pump for the time being. It is claimed that the air will destroy at least some of the impurities of the water, and the proportion which it is intended to subject the water to will be four parts air to one of water. After the experiment samples of the water as aerated and the water as now supplied will be furnished Professor Leeds for analysis and comparison.

MINNEAPOLIS.—The following bids were submitted for laying lead and iron pipe on Washington Avenue between Sixth and Eleventh Avenues south, and on Eighth Avenue south: John Fitzgerald, 40 to 60 cents per foot, according to size, and \$3.28 for stop-cocks; Martin & Taft, 23 to 56 cents per foot, according to size, and \$3.50 for stop-cocks; E. T. Sykes & Co., 40 to 78 cents per foot, and \$2.75, \$2.90, and \$3.20 for stop-cocks. Superintendent Henion reported on the matter of laying the 16-inch main from the pump-house to Washington Avenue, that it would require 937 feet of 16-inch pipe, and that there are on hand 252 feet. The cost of laying this pipe would be: 937 feet of pipe, \$2,248.80; 2,340 pounds of lead, \$865; hydrant, \$51; 16-inch gate, \$90; 125 pounds of calking, \$3.54; laying the pipe, \$562; total, \$3,042.04. The contract for the above was ordered drawn with Schikle, Harrison & Howard.

MILWAUKEE, WIS.—Nothing definite has been done toward taking steps to have the dam rebuilt.

On August 23 the Board of Public Works will open bids for the construction of a new coal-shed, boiler-house, machine-shop, and smoke-stack at the North Point Pumping-Works; cost estimated at \$25,000.

The reservoir was emptied August 16, and for the next six weeks water will be pumped through the mains, while six inches of concrete will be laid over the reservoir bottom, at an expense of \$7,000.

The new intake for the water-works will be of brick, and built 150 feet below the surface, to cost about \$500,000. This will supply a city of half a million people, and give them pure Lake Michigan water.

DEFIANCE, O.—Architect J. J. Hale has completed plans for a Lutheran church, to cost \$12,000, and the Defiance Seminary, to cost \$15,800.

GOVERNMENT WORK.

THE following bids were opened on the 25th inst. by Lieut.-Col. W. P. Craighill, of Baltimore, for building the foundations and the pier and abutment of a movable dam at Lock No. 6, on the Great Kanawha River, West Virginia, about four miles below Charleston: Harold & McDonald, Pittsburg, \$102,060.50; Keefer & Dull, Lewistown, Pa., \$136,102.50; M. D. Burke, Cincinnati, \$123,160; J. H. Wingate, Wytheville, Va., \$128,990.

ABSTRACT of proposals for improving the channel leading to the harbor at Baltimore, opened at Baltimore, 12.05 P. M., August 11, 1884, Lieut.-Col. W. P. Craighill engineer in charge: Morris & Cummings Dredging Co., New York, all 16 1/2 cents per cubic yard, Craighill Channel 14 cents per cubic yard; New York Steam Dredging Co., New York, Brewerton 15 cents, 100 yards in Craighill 13 1/2 cents; American Dredging Co., Philadelphia, all 15 1/2 cents, 100,000 yards in cut-off 25 cents; D. Constantine, Baltimore, 200,000 yards in Fort McHenry 12 cents; George C. Fages & Co., Baltimore, all of Craighill 11 1/2, Brewerton 12 1/2, Fort McHenry 17 1/2, 350,000 from channel to channel in cut-off 23 1/2 cents; Thos. Potter, Jersey City, 500,000 yards in cut-off 19 1/2 cents; Atlantic Dredging Co., Brooklyn, all 19 1/2; National Dredging Co., Wilmington, Del., Craighill 11 1/2, cut-off 20, Brewerton 12 1/2, Fort McHenry 19, all 16 1/2 cents; Ross & Sanford, Jersey City, Craighill 11 1/2, cut-off 21 1/2, Brewerton 13 1/2, Fort McHenry 17 1/2 cents; Edward Moore, Portland, Me., cut-off 23, all 16 1/2 cents; Thomas P. Morgan, Washington, Fort McHenry 16 (material that can be worked with clam-shell dredge), Fort McHenry 26 cents (for all hard material requiring dipper-dredge); Henry DuBois Sons, New York, Brewerton 10 3/4, 100,000 from Craighill 10 3/4 (provided all bid for is awarded), 100,000 from Fort McHenry next to Brewerton 10 3/4 cents; Benson & McNee, San Francisco, Craighill and Brewerton 23 1/4 cents.

POST-OFFICE, ETC., HANNIBAL, MO.—Synopsis of bids for stone and brick-work of basement and superstructure, opened August 16, 1884: Smith & Sargent, stone-work, \$24,333, brick-work, \$11,414; R. & W. Haven, \$24,900, \$10,450; Larkworthy & Menke, \$23,160, \$9,775; Joseph M. Marshall, \$42,500, \$12,856.

POST-OFFICE, HARRISBURG, PA.—Synopsis of bids for decoration and frescoing, opened August 22, 1884: M. Beck & Co., \$10,000; E. S. Miragale, \$7,350; John Gibson, \$7,400.

DREDGING, ETC., POTOMAC RIVER.—Synopsis of bids for dredging and forming embankment in the north-east margin of section 3, flats on Potomac River, Washington, D. C., opened August 20, 1884: Morris Cummings & Co., New York, 22c. per cu. yd.; Atlantic Dredge Co., Brooklyn, 13 1/2c.; Ross & Sanford, Jersey City, 11c.; D. Constantini, Baltimore, 12 1/2c.; Thomas P. Morgan, Washington, 15 1/2c.; F. C. Somers, Philadelphia, 10 3/4c.

DREDGING POTOMAC RIVER.—Synopsis of bids for dredging in the Washington Channel, Potomac River, near Washington, D. C., amount to be dredged, as estimated, about 1,000,000 cu. yds., more or less, opened August 20, 1884: D. E. Culver & Co., New York, 18 1/2c. per cu. yd., or \$208,125; Rittenhouse Moore, Mobile, 13 1/4c., \$137,500; Benson & McNee, San Francisco, 12 1/2c., \$123,700; Morris & Cummings Co., New York, 28c., \$315,000; Ross & Sanford, Jersey City, 19 1/4c. \$209,843.75; Nat. Dredge Co., Wilmington, 21c., \$236,250.

RIP-RAP STONE, POTOMAC RIVER.—Synopsis of bids for rip-rap stone for foundation of sea-wall, Potomac River, Washington, D. C., opened August 20, 1884: S. Carmody, New Geneva, Pa., \$69,000; G. Vanderworken, Washington, \$31,650; J. A. Blundon, Washington, \$34,500; W. H. Groat, Washington, \$29,100; Potomac Red Sandstone Co., Washington, \$24,450; H. R. Gilbert, Washington, \$31,500.

GALVANIZED-IRON WORK, WASHINGTON, D. C.—Synopsis of bids for galvanized-iron work (flue-linings), for building State, War and Navy Departments, at Washington, D. C., opened August 18, 1884: C. Thompson, \$9,558; Simpson & Gey, \$10,561.56; Whyte & Overman, \$9,480; Otto Wolfsteiner, \$7,497.50; Bartlett, Hayward & Co., \$10,800.

FIRE-ENGINE HOUSE, WASHINGTON, D. C.—Synopsis of bids for fire-engine house, District of Columbia, opened August 20, 1884: C. Thomas, \$7,910; Bright & Humphreys, \$8,577; J. H. Howlett, \$10,300; R. W. Darby, \$8,490; S. D. Phillips, \$9,200; R. Downing, \$9,937.

Literary.

THE CENTURY.

THE *Century* is always an entertaining visitor, and the number for September is well up to the standard.

Among the many topics treated there is one which is apropos of the recent weather—viz., that by Prof. S. P. Langly, on the sun spots, and is the first of a series of articles on the New Astronomy. There are also articles by Rev. Newman Smyth, on the "New Theology," and the second installment of Mr. Stillman's "On the Track of Ulysses."

The leading illustrated article is entitled "From Coventry to Chester on Wheels."

The department of Open Letters is well supplied, and Gen. Colston writes of "The Rescue of Chinese Gordon." The serials are continued, and that by Mr. James, entitled "A New England Winter," is concluded. There are also the usual poems and short stories.

HARPER'S.

Harper's Magazine for September is handsomely illustrated and presents a wide variety of entertaining reading-matter. There is an article on George Fuller, by F. D. Millet; an engraving of "An Ideal Head," taken from one of his paintings, forms the frontispiece. Glimpses of Rural Scenes in the Low Countries forms the topic of the current chapter of George H. Boughton's "Artist Scenes in Holland." "A Run Ashore at Queenstown" is suggestive of pleasant memories to those who have traveled across the Atlantic and interesting to those who have not. Ernest Ingersoll contributes an entertaining article, effectively illustrated, on the Wheatfields of Columbia. Chapter X. of Mr. Roe's "Nature's Serial Story" is presented with exquisite illustrations from the pen of Mr. W. H. Gibson. Robert Buchan's article on Charles Reade is a personal sketch, with a portrait of the novelist from a painting bequeathed by him to the Messrs. Harper. "The Reservoir System" is the title of an interesting article by J. G. Pyle, illustrated by diagrams. The number is rich in poetry, and the editorial departments have much interesting matter.

THE MANHATTAN.

THE September *Manhattan* takes the reader over much of the world, in five entertaining papers treating of widely-separated places. The papers referred to are entitled "The Misericordia of Florence," by Ada Bokounine; "A Glance at the Hungarian Capitals," by J. W. Davis; "On a Siamese Pagoda," by David Ker; "A California Arcadia," by Ernest Ingersoll; "A Corner of the Gulf of Mexico," by Robert S. Day. The number is well illustrated and contains several short stories and poems.

THE ATLANTIC.

THE *Atlantic Monthly* for September presents varieties enough to please the most rational reader. There are several short stories in addition to the usual serials, poems from the pens of Lucy Larcom, Mrs. Julia C. R. Dow, and Paul H. Hayne, and reviews of several new books. On the whole, the September number is a very readable one.

MESSRS. JOHN WILEY & SONS have in press, to be issued this fall, a practical treatise on the locomotive, entitled "Locomotive-Engine Running and Management," by Angus Sinclair, M. E., part of which has been contributed in articles by the author to the *American Machinist* and other technical journals.

A CONSOLIDATION.

Indoors and Outdoors, the organ of the National Association for Sanitary and Rural Improvement, edited by Charles F. Wingate, has been incorporated with the *Countryside*, Mr. Wingate remaining on the staff of the new journal.

The first number of the new *Countryside* is a very creditable one, and is filled with interesting matter.

TRADE CATALOGUES.

MESSRS. HITCHINGS & CO., of 233 Mercer Street, New York, have sent us the latest edition of their catalogue of green-house and other hot-water heating-apparatus and fittings. Several apparatuses are shown for warming water for domestic purposes when the quantity is large.

We are also in possession of the well-illustrated catalogue of the Whittier Machine Company, of Boston, showing the varieties of machinery manufactured by them.

CINCINNATI INDUSTRIAL EXPOSITION.

THE Twelfth Grand Industrial Exposition at Cincinnati will be open to the public from September 3 to October 3, inclusive.

The Board of Trustees have made arrangements to receive articles intended for exhibition on and after August 13.

The exposition is universal in its character, and among the exhibits will be found various kinds of machinery, metals, heating-apparatus, food products, wall decorations, grates, mantels, steam, air, and gas engines, electric-motors, gas-making apparatus, as well as a great variety of the products of science and art, all grouped in appropriate departments.

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b, brown stone; br, brick; br st, brick store; ds dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

414-16 W 50th st, 2 5-story br tens; cost, \$16,000 ea; o, Adolph Koschel.
57th st, n s, 296 w 6th av, 4-story br and st dwell; cost, \$30,000; o, Dr. G. Langmann; a, Edward E. Raht; m, Marc Edlitz.
406-8-10 W 46th st, 3 5-story tens; total cost, \$46,000; o, Peter Adams, by Henry H. Bowman; a, J. L. Ackerman; b, J. A. O'Connor & Co.
234 9th av, 5-story br ten; cost, \$15,000; o, James A. Breakell; a, John A. Hamilton & Co.
512 W 36th st, 6-story br factory; cost, \$15,500; o and b, James Curran.
110th st, n s, 125 e 4th av, 4 5-story br and tens; cost, \$20,000; o, John Van Dolan; a, A. Spence.
77th st, n s, 100 e 4th av, 2 2-story stables, storage-rooms, and dwell; total cost, \$30,000; o, Henry H. Cook; a, W. W. Smith; b, J. J. Tucker and W. Germond & Co.
106th st, n s, 238 e 1st av, 3 5-story br st and tens; cost, \$12,000; o, Wilhelmine Juch; a, C. von Biela.
162 E 117th st, 3 3-story br dwells; cost ea, \$8,000; o, Homer G. Murphy; a, James E. Ware.
Av A, w s, from 84th to 85th st, and 75 w on 84th and 85th sts, 8 5-story br tens and st on av, and 4 5-story br tens on sts; cost ea, \$13,500; o, Frederick Schuck; a, John Brandt.
100th st, s s, 100 w 10th av, 7 4-story br dwells; cost ea, \$10,000; o, Mrs. Annabella Kaughan and Mary E. McCool; a, John C. Burne.
420-22-24-26 W 72d st, 4 5-story br st dwells; cost ea, \$20,000; o, George W. Hamilton; a, Thom & Wilson.
9th av, e s, 252 n 9th st, 2 5-story br and terra cotta tens; cost ea, \$14,000; o, Henry Bornkamp, by C. Bornkamp; a, MacLay & Davies.
84th st, s s, 250 w 11th av, 3 3-story br dwells; cost ea, \$8,500; o, Martha C. Inglesie; a, J. E. Turhune; b, E. Vreeland and Van Doon.
2d av, s w cor 128th st, 4 5-story br tens and st; cost ea, \$16,000; o, Alexander P. Ketcham and others; a, George Martin Huss.

BROOKLYN.

Madison st, n s, 200 e Stuyvesant av, 3 1/2-story and bmt br st dwell; cost, \$4,000 ea; o, G. de Revere; a, Amzi Hill.
Private st, bet Baltic and Butler sts, 115 w 3d av, 24 2-story and bmt br dwells; cost ea, \$2,500; o, James W. Dearing; a, Parfitt Brothers.
11th st, s s, 197 e 4th av, 6 2-story and bmt br dwells; cost ea, \$3,500; o and b, C. B. Sheldon.
St. Marks pl, s s, 150 e New York av, 3-story br dwell; cost, \$30,000; o, Henry L. Wardell; a, George P. Chappell; b, James Ashfield & Son and Myron C. Rush.
Atlantic av, s s, 440 w Troy av, 4 2-story and bmt br dwells; cost ea, \$2,500; o, Cora Waldron; a and b, Essex Roberts.
Lafayette av, s s, 278.4 w Throop av, 4 2-story and bmt br dwells; cost ea, \$3,000; o, etc., John K. Bulmer.
Kossuth pl, n s, 100 w Bushwick av, 6 2-story flats; cost ea, \$2,700; o, etc., Cozine & Gascoine.
Skillman st, e s, 25 n Park av, 3 3-story br tens; cost for all, \$12,000; o, Mrs. McKenna; a, J. L. Reynolds; b, Charles Collins and Mr. Williams.
Park pl, s s, 300 w Vanderbilt av, 3 3-story and bmt br st dwells; cost ea, \$7,500; o and b, John V. Porter; a, W. M. Coats.
President st, n s, 87 e 7th av, 5 3-story and bmt br st dwells; cost ea, \$10,000; o, a, and c, William Flanagan; m, John Sharock.
Macon st, n s, 135 e Sumner av, 3 2-story and bmt br st dwells; cost ea, \$4,800; o, etc., Colson & Reinera.

Macon st, n s, 365 e Nostrand av, 2 3-story br dwells; cost ea, \$7,000; o, Mrs. Godwin and D. H. Fowler; a, Amzi Hill.

Garfield pl, s s, 56 e 7th av, 2 3-story and bmt b s dwells; cost, ea \$9,000; o, a and b, Martin & Lee.
Manhattan av, w s, 25 n Norman av, 3 3-story br sts and dwells; cost, ea \$5,000; o, Adrian Meserole; a, F. Weber; b, Smith & Gately and S. J. Randall.
Greene av, s s, 200 w Marcy av, 5 2-story and bmt br dwells; cost, ea \$4,500; o, E. W. Phillips; a and b, D. Weid.

Manhattan av, n e cor Norman av, 4 4-story br sts and tens; cost, ea \$6,000; o, a, etc., Randell & Miller; m, J. & J. Van Riper.

Washington av, e s, 125 n Gates av, 3-story br dwell; cost, \$11,000; o, F. J. Randall; a, A. Hill; b, D. H. Fowler.

Union st, s s, 248 e 7th av, 4 3-story and bmt b s dwells; cost, ea \$11,000; o, E. B. Sturges.

Whipple st, s s, 150 e Throop av, 4-story br tin factory; cost, \$12,000; o, M. C. Chambers; a, J. Platte.

ALTERATIONS, NEW YORK.

4th av, s w cor 62d st, raised in portions one story, walls strengthened and internal altms and improvements, rear half of bldg rebuilt, new boiler-vents, etc.; cost, \$100,000; o, Edward Martin as trustee of New York Life Ins. Co.; a, W. E. Worthen.

206 W 47th st, extn to be raised one story, walls of front bldg taken down and rebuilt; cost, \$5,000; o, John Spannhake; a, Adam Weber.

9th av, n e cor 39th st, 1-story br extn; cost, \$5,000; o, trustees of the North Presbyterian Church, John Cameron treas.; a, J. C. Cady & Co.; b, James H. Parker and Wm. Mulgrew.

69 New st, new st front in bmt and internal alterations; cost, \$5,000; o, William Spencer; a, A. B. Ogden & Son; b, D. E. Herbert and John C. Umberfield.

116 E 26th st, addn 1-story; cost, \$6,000; o, John Smith; a and c, C. F. Valentine; m, E. A. Thorp.

ALBANY, N. Y.—Elk st, addn to St. Agnes School; cost \$10,000; o, the Corning Foundation; a, R. W. Gibson; b, Thomas Stephens.

Grand st, gas-tank; cost, \$75,000; o, Albany Gas Co.; a, Isaac Battin; b, John Rein.

South Pearl st, new store front; cost, \$5,000; a and b, Adolph Fleischman.

Wash av, cor Dove, improvement; cost, \$15,000; o, Mr. Amsdel; a, Ogden & Wright; b, J. A. Shaitoc and M. Havens.

BALTIMORE.—Fulton, n w cor Prestman st, 3 br bldgs; o and b, John Coyle.

S s Montgomery st, br bldg; o and b, Daryl Coen.

E s Broadway, br bldg; o, C. C. Fink.

N s Jefferson st, 8 br bldgs; o and b, S. A. Merchant.

W s Chester st, 18 br bldgs; o and b, S. A. Merchant.

F s Hanover st, 26 br bldgs; o and b, E. W. Haveland.

N s Chase st, br bldg; o, A. H. Brinton.

F s Sharp st, br bldg; o, G. H. Kuhst.

W s Madison st, 4 br bldgs; o and b, Jos. Turner.

W s Madison st, 3 br bldgs; o and b, Jacob Gerwig.

F s Eutaw pl, 14 br bldgs; o and b, Jacob Gerwig.

F s Hurk st, 3 br bldgs; o and b, C. H. Michelman.

W s Park st, 3 br bldgs; o and b, C. H. Michelman.

W s Bayard st, 12 br bldgs; o and b, Miller & Coleman.

N e Ward st, 17 br bldgs; o and b, Miller & Coleman.

E s Carroll st, 16 br bldgs; o and b, Miller & Coleman.

W s Fulton av, 2 br bldgs; o, Mary N. Scott.

W s Canton st, 5 br bldgs; o and b, P. J. King.

S s Chew st, 2 br bldgs; o and b, D. L. Bangert.

Mount, n e cor Franklin st, 8 br bldgs; o and b, J. B. Ervine.

W s Choptank st, 2 br bldgs; o and b, Binyon & Andouan.

S s Mulberry st, 11 br bldgs; o and b, W. B. Turner & Son.

Fulton, n e cor Patterson st and Park av; o and b, Geo. Gogel.

N s Irvin st, 8 br bldgs; o and b, J. S. Smuck.

Charles st, br bldg; o, Dr. Wm. A. Moale.

221 Gay st, e s, br bldg; o, Hy M. Tirabier.

E s Ann st, 9 br bldgs; o and b, Agt. Hanneman.

McCulloch st, 13 br bldgs; o and b, Jacob Gerwig.

BOSTON, MASS.—Washington st nr La Grange st, 1 dwell; o, L. McQueeney; b, R. J. Willis.

42 Middle st, dwell; o, J. Foster; b, C. E. Snow.

Phillips st nr Longwood av, 3 dwells; o, J. P. Lang; b, Max Weise.

Commercial st nr Shamrock st, fr mechanical bldg; o and b, Bugher & Spooner.

Foundry st, fr offices; o, O. C. R. R.; b, Samuel Stevens.

2241 Bolton st, fr dwell; o, P. O. Leavy; b, W. F. Eaton.

Union av nr Green st, 2 fr dwells; o, P. McDonald; b, G. A. Cahill.

1601 Tremont st, fr dwell; o, D. J. O'Keefe.

14-16 Dale st, br dwell and st; b, J. Patton.

11-13 Rockland st, a br dwells; o, F. W. Watkins.

10-16 Shawmut av, br dwell and st; o, Dewing & McClure; b, C. H. Dwyer.

BUFFALO, N. Y.—Building projects in Buffalo are still pretty much at a standstill, on account of the masons' and bricklayers' strike. At a recent meeting of the Builders' Association it was decided to apply to the courts for an injunction against the Masons' Union, restraining them from interfering with non-union workmen. It is thought if the strikers are restrained from interfering, plenty of non-union men will be found to go on with the work.

CHICAGO, ILL.—476-78 Belden av, br dwell; cost, \$10,000; o, N. Hurlbut; a, H. L. Gay; b, Jno. Pedgrift.

703-67 Washington boul, br dwell; cost, \$12,500; o, Jno. Featherstone; a, F. Baumann; b, Louis Weick.

366 Chestnut st, br flats; cost, \$10,000; o, A. C. Hising; a, Bauer & Hill; b, C. Thiele.

1728-24 Bullenfield, br and st pastoral residence; cost, \$25,000; o, Rev. Jno. Waldron; a, J. J. Egan; b, B. Mahon.

404 Maxwell st, br dwell; cost, \$11,000; o, George Edwards; a, Bowman.

3807-15 State st, br st and dwells; cost, \$35,000; o, Henry Bioroth; a, J. C. Doerr; b, George Schneider.

523 Hurlbut st, br dwell; cost, \$6,000; o, Saehn Bros.; a, C. A. Gottig.

3654-56 Dearborn st, br dwell; cost, \$5,000; o, J. C. McGrath.

1148-50 Harrison st, br flats; cost, \$5,000; o, George M. Hull; a, Burnham; b, Wm. Kerr.

804 Monroe st, br dwell; cost, \$7,000; o, Aug. Doring; a, J. M. Van Odel & Co.; b, Fox & Hinds.

1107 Blue Island av, br st and dwell; cost, \$5,600; o, B. J. Kenally.

(Continued on page 308.)

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WARNING!

As we go to press, we learn that a man calling himself John J. King has been collecting money on worthless checks, and forging the name of this journal and its publisher. He is described as a thick-set, dark-complexioned man about thirty-five years old, and is at present operating in New England.

FOREWARNED, BUT NOT FOREARMED.

THE counties of Hudson and Essex contain one-third of the inhabitants of the State of New Jersey. Three-quarters of the inhabitants of these counties, or one-fourth of the whole population of the State, drink the water of the Passaic River, taken from a point where the tide, laden with the sewage of 140,000 people, flows up and meets the downward current bearing the sewage and factory refuse of 60,000 dwellers in other cities on its banks a few miles above.

There is nothing new in this statement. The facts have been known to every inhabitant of Jersey City and Newark for a number of years. The people of Newark have had several spasms of alarm on the subject. They have even gone so far as to have examinations made by experts to see if there was any other source whence they could derive their water. They have even stirred up the people of Jersey City to unite with them in hiring a chemist to tell them month by month what nasty water they are using, and the public officials of the two cities have constituted themselves a Board of Pollution, as they term it, to meet, and look at, and talk about the filthy river every little while.

They induced the Legislature of the State to create a commission to devise plans for a co-operative water-supply for separate municipalities, and thus procured at the expense of the State suggestions and advice from expert engineers as to the best means of relief from their difficulties. But still they have done nothing practical toward relieving themselves, and have not even made an approach to a decision on this vitally important subject. The conclusions of the State Commission of 1884 were virtually the same as those reached by the engineers employed by the Newark Board in 1879, that the only means of obtaining plenty of pure water is by going to the Passaic River above Paterson and Passaic. So that five years of valuable time have been wasted in trying to find just how vile the combination is of sewage and factory wastes on which this large population is dependent for all its water-supply.

Now there is a fresh panic. The little city of Passaic has found it necessary to build sewers, and has adopted a plan of sewerage which will involve the discharge of the sewage into the river. The "Board of Pollution" has convened and received harrowing reports from its inspectors of the number of carcasses of dogs found floating in the river, and has protested against the citizens of Passaic making the river a receptacle of their refuse, in a manner similar to that followed by Newark for many years. If Passaic does not heed the protest the aid of the law is to be invoked.

There is no doubt that Passaic proposes to do a nasty thing, and that it ought not to be permitted. But it should not be forbidden only in order that Jersey City and Newark may continue to use the river water, which the chemists and

engineers, not to speak of common-sense, say ought not to be, and is not and cannot be made fit to be used. Taken in connection with the sewage of Paterson's 60,000 inhabitants and numerous factories, and the backflow of the Newark sewage, the additional sewage of the 7,000 inhabitants of Passaic will not make the water much worse at any rate.

The Board of Pollution will do better to spend the money which the legal proceedings they are undertaking will cost, in having detailed surveys and estimates made for procuring a supply of clean water from another source. Engineers cost less than lawyers, and their work is more conclusive and certain. For the cost of one lawsuit, there is little doubt that the works needed for bringing fifty million gallons of good water daily to the Newark and Jersey City pumping-works on the Passaic River could be prepared for putting under contract, and an appeal to the Legislature would doubtless result in authority being given in time to construct the works before next summer.

If the cholera should reach this country by that time, as is not improbable, and these cities should be ravaged by it, as they would be likely to be, the loss would be justly ascribed, not to a "visitation of Providence," but to the culpable improvidence and neglect of the dilatory official water boards, who have dawdled, and temporized, and refused to heed the warnings of the experts and the voice of reason.

POPULAR SCIENCE.

THE scientific epidemic which has broken out in Montreal will reach its culminating point in Philadelphia early this month. The meeting of the British Association for the Advancement of Science outside of the British Islands for the first time in its existence, has excited great interest among scientists of all classes, and after its adjournment a large number of its members and the numerous attendants who follow in its wake will visit Philadelphia, in response to an invitation from the American Association for the Advancement of Science, which will hold its thirty-third session there from September 4 to 11. The nine sections into which the association is divided cover nearly every conceivable branch of scientific research, and the papers and discussions will doubtless be of great value for future reference. There will also be held at the same time meetings of the American Institute of Electrical Engineers, accompanied by a large exhibition of electrical appliances; the Pennsylvania State Agricultural Society, the Agassiz Association, and the American Institute of Mining Engineers. In order that the scientists may not overwork themselves and be dull, the citizens of Philadelphia have prepared excursions and entertainments almost without end for the social enjoyment of their visitors. No such opportunity has been offered before for meeting so many men of eminence in various branches of science, and the social element will undoubtedly predominate over the earnestly scientific. There will be a great deal of enjoyment in attending this gathering, for there is no one who so thoroughly appreciates and makes the most of a good junket as the real man of science, who knows some things perfectly and does not pretend to know everything, and therefore is ready both to fight on his own ground and to gambol on that of his neighbors.

RECORDING STEAM-GAUGES.

THE recent decision of the Board of Supervising Inspectors of Steam-Vessels against the use of recording steam-gauges on steamboat and other marine boilers, has brought to the attention of the public the fact that certain wise provisions of the United States statutes, which were enacted to protect the traveling public against criminal recklessness on the part of engineers, cannot be carried into effect, because, in the opinion of the board, the apparatuses so far devised for this purpose do not comply with a rigid interpretation of the law. Part of Section 4,418 of the Revised Statutes provides "that suitable steam-registers, that will correctly record each excess of steam carried above the prescribed limit, and the highest point attained," shall be used on all boilers of "every vessel propelled in whole or in part by steam" (§ 4,399, R. S.), "navigating any water of the United States which are common highways, excepting public vessels of the United States, vessels of other countries, or boats propelled in whole or in part by steam for navigating the canals." (§ 4,400, R. S.)

From this it will be seen that Congress meant to put a check that would be self-recording on engineers or others who, through carelessness or a desire to race, would exceed the pressure allowable by law and deemed safe by the local inspectors on all coastwise and river steamboats, including, of course, our crowded excursion-boats.

In another column we give a brief description of a few of the inventions that have been gotten up for this purpose, and which, though having many of the points required for perfection, are nevertheless unused.

Private individuals use recording-gauges for their own protection and that of their employees and property, and for stationary boilers they seem to give satisfaction.

Some years since the Rules and Regulations of the Supervising Inspectors did require something of this kind, but now Rule 41 provides only that "all boilers or sets of boilers shall have attached to them at least one gauge that will correctly indicate the pressure of steam."

It is plainly manifest that some further protection is necessary than that accorded by an ordinary steam-gauge; that some knowledge or proof would remain of what has transpired in this respect during a trip, and what would be an indelible record of the pressure at which a boiler exploded, should a catastrophe occur.

Aside, also, from the question of inspection by a regularly authorized agent, the intelligence and observation of an American public will go far to be a check on reckless engineers, so long as a recording dial occupies a prominent position within the observation of the passengers.

THE Philadelphia Electrical Exhibition, which is announced to open on September 2 without fail, promises to be of unusual interest. Congress has recognized the undertaking by calling a national conference of electricians to meet in connection with the exhibition, and has appropriated \$25,000 to defray the expenses of the commission. Professor H. A. Rowland, of Baltimore, has been selected by the President as chairman of the commission to conduct the conference. The exhibition will cover every department of electrical industry, and include a library of the literature of electricity, both ancient and modern treatises. Electrical relics will be exhibited, with no end of electric-lights, telegraph instruments, telephones, batteries, cables, signaling apparatus, dynamos, electro-plating apparatus, etc.

THE statue of Liberty, the gift of the people of France to the people of the United States, has recently been completed and formally presented to Mr. Morton, the American Minister in Paris, and is ready to be shipped as soon as the pedestal shall be ready to receive it. Only about one-half of the sum necessary to complete the pedestal

has been contributed, and that mainly by the citizens of New York and vicinity, and the committee having the matter in charge has issued an urgent appeal calling attention to the lack of funds, and requesting contributions, either large or small.

The statue is in no way a private enterprise, but it is a memorial of ancient and continued good will existing between two great nations, and it is to be hoped that the appeal of the committee will be met with a prompt response.

OUR BRITISH CORRESPONDENCE

Effects of the Sun—Fish Unfit for Food—Population of Athens—Discovery of Skeletons at Orkney—Novel Insurance Enterprise—The Thames Valley Drainage.

LONDON, August 23, 1884.

AN inquest was held recently at Mansfield on the body of a boy who had died under rather singular circumstances. It appeared that the deceased and another boy had tried who could look at the sun the longest. They put the trial to a test, and the deceased a short time after complained of intense pain in the eyes and head. The pain increased greatly at night, and in a few hours the boy died in great agony. Boys are fond of mischief and doing silly things, but I think this piece of folly caps everything.

Last month the officers of the Fishmongers' Company seized at Billingsgate Market upward of 86 tons of fish as unfit for human food. Of this 54 tons were wet-fish and 32 tons shell-fish. The fish seized included 19 tons of winkles and 37 tons of whiting. This seems an enormous waste, but when it is stated that the weight of fish delivered at Billingsgate during the same period was 10,815 tons, and taking into account the hot weather, the quantity seized is not so very large. Talking of fish, I see steps have been taken to prevent street vendors of fish from throwing the offal into the highway. A costermonger was recently summoned by the Walthamstow Local Board for doing this. It transpired that costermongers as they sold their fish would clean them and throw the offal into the roadway; an injurious practice at any time, but more particularly during the present hot weather. The defendant in this particular case was let off with a nominal fine, it being the first case of the kind brought before the magistrate.

The census taken in April last of the inhabitants of Athens shows a very large increase. The total population now is 85,000, more than 18,000 more than when the last census was taken, in 1879. In 1856, when the first census was taken, the population was only 30,000. The increase is due, to some extent, to immigration, but the improved sanitary condition of the place has a great deal to do with it.

Near the Lock of Stennes, Orkney, a large mound was recently opened and it was found to contain a chamber about seven feet long, and five feet broad, and three feet high, and in each corner of the room there was a skeleton. The discovery has proved of interest to antiquarians. The chamber above described is reached by a passage twelve feet long, three feet broad, and three feet high.

A firm of insurance brokers have projected a novel insurance enterprise. It is proposed to insure against the effects of zymotic diseases in connection with accident insurance. Policy-holders are to be paid a weekly compensation during disability from either of the several diseases mentioned in the policy, or the amount of insurance is to be paid at death. Insurers against the consequences of disease are to secure periodical inspection of their dwellings, after the fashion of the inspections made by the steam-boiler insurance companies. The prospectus invites subscriptions to the capital stock, which is placed at two hundred thousand pounds sterling. There is criticism here on the action of the Duke of Buckingham and Captain Douglas Galton, who have signed and permitted the publication of a letter in their official capacity of "Chairman" and "Member of the Executive Council, International Health Exhibition," in which they announce that "having had their attention closely drawn to matters connected with health and the loss inflicted on large numbers by preventable sickness have agreed to join the directorate of the company," and they "invite a careful perusal" of the prospectus "as well worthy serious attention." I fancy

that your readers will be glad to see the experiment tried, yet they will agree that positions on the Executive Council of the I. H. E. should not be used to promote commercial enterprises, and that the action referred to sets an example that others will be too prone to follow, with no resulting good to the cause of sanitation, as experience in England has demonstrated.

The Lower Thames Valley drainage (which was noticed editorially in your columns a short time since) continues to be a subject of extended newspaper correspondence. As with almost everything else, there are two sides to the question. It is claimed by those who uphold the action of the committee in rejecting the scheme that the collecting together at one point of the entire sewage of the district would give rise to a great nuisance in spite of any precipitation process which could be carried out, and that certain of the parishes would be unfairly benefited at the expense of the others. It is claimed that while the scheme was sanctioned by the Local Government Board, the highest engineering authority of the board was opposed to it. The engineers for Richmond, Heston, and Isleworth (the opposing parishes) claim that even if a year is required to constitute the local authorities, the local works will still be finished in less time than would be required to complete the combined works, and the final result will be much more satisfactory, and involve a smaller outlay. As far as the practicability of treating the sewage by a chemical process involving the use of lime with salts of alumina and iron is concerned, it seems to be agreed that an effluent can be obtained fit, at any rate, to discharge into a stream not used as a source of water-supply. The recent judicial decision in the case of Hertford tends to confirm this view. The local authorities of Hertford were allowed to discharge their sewage into the sea after treatment by the lime process, or by the process which at any time was the best process practicable, the Board of Trade to be the judges of what is the best practicable process. The Lea Conservancy Board brought action against them for fouling the river, and claimed that deposits of sewage matter were formed in the stream, and that the brook through which the sewage flows was a nuisance. They did not raise the point as to the best practicable process, as that was a question for the Board of Trade and not for the court, but they claimed that the process was not properly carried out, and aimed to establish the existence of a nuisance. The judge, in giving his decision in favor of the local authorities, virtually asserted that the treatment with lime, etc., was the best practicable process; but as this was not the real point at issue, too much weight should not be laid upon the decision.

SAFETY-VALVE.

HENRY L. DALTON.

MR. HENRY L. DALTON, a member of the firm of Dalton & Ingersoll, plumbing-material dealers, of Boston, Mass., died on August 29, at his summer home in Hingham. Mr. Dalton was a native of Boston, and began business in 1846, the firm being Swallow & Dalton. This connection was dissolved, and in 1847 he established the well-known firm of Dalton & Ingersoll.

Mr. Dalton was respected by all with whom he came in contact, and was held in high esteem by his business associates. He leaves a wife and two daughters.

THE Troy, N. Y., *Times* says that Northside, opposite Cohoes, is to have a water-supply. The plan originated with J. W. Himes, the proprietor of the Diamond mill. A pumping-station will be constructed south of Mr. Himes' factory, and the main will extend from the Cohoes and Waterford bridge to the cemetery. Fire-plugs will be located at convenient distances, and a hose company organized.

THE Treasury Department has decided that the plans of the Supervising Architect for public buildings shall be prepared upon a scale limited by the amount appropriated in the first instance by Congress. It has been the custom to obtain plans for a \$400,000 or \$500,000 building when an appropriation of \$150,000 or \$200,000 was made, the expectation being that Congress would subsequently increase the appropriation, and this was generally done. Thus cities which did not dare to ask for expensive buildings in the first place, have succeeded in getting large sums of money appropriated to finish buildings which had been begun on a larger scale than the sum first granted would warrant.

SOME DETAILS OF DRAINAGE AND PLUMBING IN THE RESIDENCE OF MR. J. H. SCHIFF.

ON the east side of Fifth Avenue, between Seventy-fourth and Seventy-fifth Streets, in this city, Messrs. Mead & Rossman, master plumbers, are fitting up two houses, one for Mr. J. H. Schiff and the other for Mr. Alfred M. Hoyt, of which the architects are Messrs. Schwarzman & Buckman, about which there are some special features. The principle employed in both is the same, but as the houses are very different in construction and plan, we will confine ourselves to a description of the special features of the drainage in Mr. Schiff's house, which will answer for the two.

The plan, Fig. 1, shows the rear end of the cellar. In this house, instead of the house-drain running to Fifth Avenue, and having a "pitch" in that direction, it runs to the rear wall of the house, thence to a "right-of-way" (seen at the left) ten feet wide, which has been secured to the property-holders facing the avenue, through which the house-sewer runs to the main sewer at Seventy-fourth Street. The pipe *a* is the "house-

yet determined, but it is evident that a very small quantity of water will be required, and that presumably one discharge in the twenty-four hours will be ample for the greatest possible contingencies.

Some of the roof-water and the water shed by the flags of the yard is carried into this basin, to secure a rapid and copious flushing of the drain and sewer when rain falls.

The sewer *d* is three inches in diameter and extra heavy pipe, as are all the other cast-iron pipes, but the peculiarity of this particular pipe is its rust joints. It is intended solely for the "blow-off" from the boiler, and the rusted joints are to protect it against the possibility of working loose at the hubs, as lead will when exposed to steam heat or very warm water. In other respects the diagram explains itself.

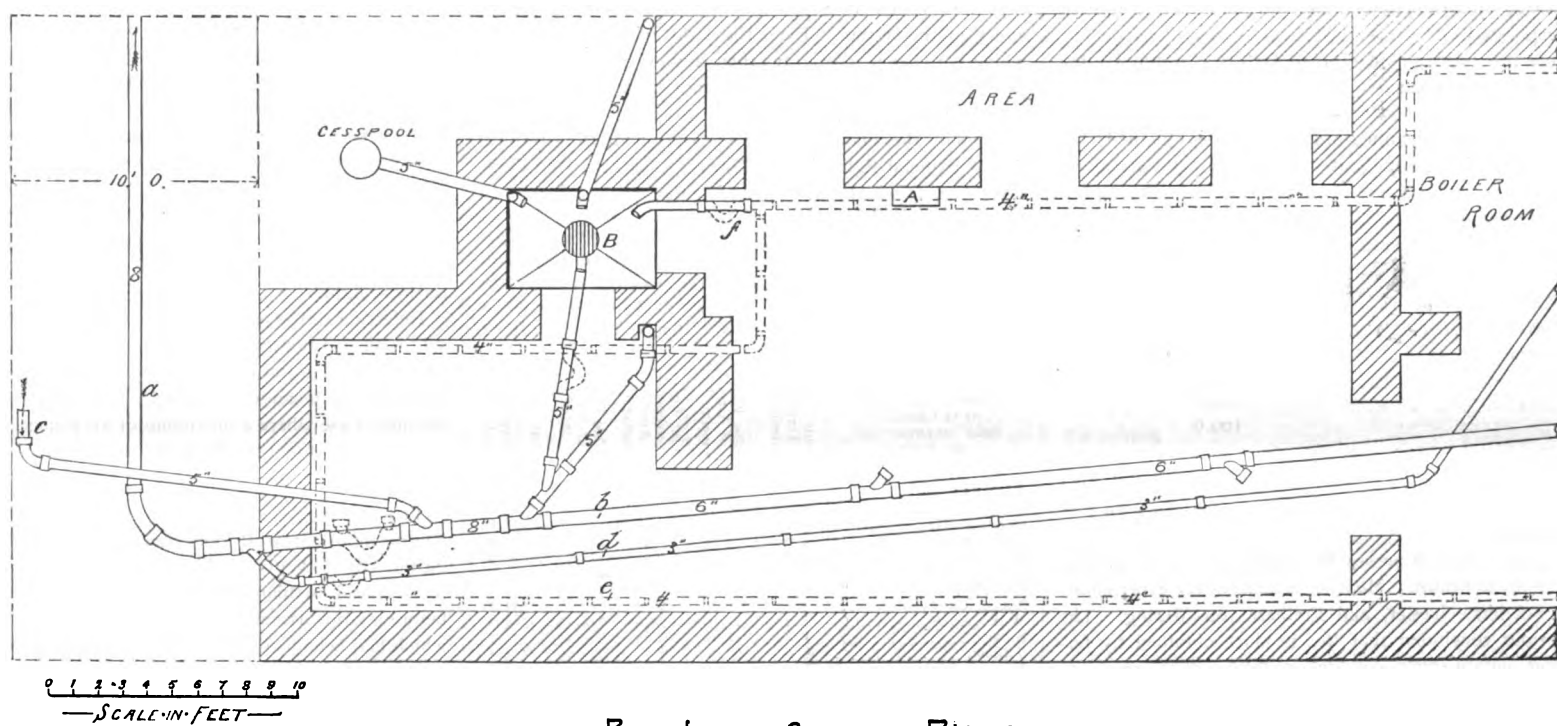
Figure 2 shows the "cut-off" used in these houses. The pipes *b* and *c* are from the tank and "Croton" boilers respectively, the pipe *a* being the warm-water pipe to the fixtures from the pipes *b* and *c*. In like manner the cold "tank-water" and cold "Croton-water" flows

through the pipes *d* and *e*, as the case may require, passing to the fixtures through the pipe *f*. As will be seen by reference to the illustration, the two lever-handles of the three-way cocks are brought into such position and are of such shape as to form but a single grip, that the two cocks may be manipulated by the same movement, but withal leaving it free to move a single cock when desirable.

The risers, recesses, or "chases," in these houses where they occur in outside walls, are all lined with hair-felt to prevent the freezing of the pipes in extreme cold weather. The method is to face the walls or recess with matched boards, and on it spread hair-felting sufficiently wide to come together at the front and lap at the time when the pipes are to be covered.

The water-pipes throughout this house are heavy lead, secured in their perpendicular positions with tacks of more than usual closeness.

Elsewhere in our columns will be found an account of an experiment by Messrs. Mead & Rossman, to test the efficiency of covering for water-pipes.



PLAN OF SEWER PIPES

FIGURE 1.

sewer." The pipe *b* is the "house-drain;" *c* is the "foot-vent," which is carried up a short distance against the fence at the outer wall of the right-of-way, *d* being a special house-drain for the boiler. The pipes *e*, shown with dotted lines, are for subsoil drainage, and make a circuit of the footings of the building.

The principal point of interest is the manner in which the subsoil drainage communicates with the sewer, and the means provided to prevent a passage of sewer-air through the trap of the subsoil pipes or other intervening traps and pipes from the evaporation of seals during continued dry weather, and to cut off direct communication with the sewer, so that pressure, whether vacuum or plenum, may not unseat the traps.

To secure a water communication between the subsoil pipes and the house-drain pipe that will be freely open to atmosphere, the receiving-chamber B has been provided. Its bottom is carried below the line of the drainage-pipe, but not sufficiently low to be below the house-drain, which, at the rear, is well down; the rock bottom on which the house stands being cut deep for the drain and sewer. The subsoil pipes are collected into the iron trap *f*, and thence discharge into the basin B. From this basin the water runs into the house-drain through the 5-inch trapped-pipe shown, passing through the house-trap on its way to the main sewer. To secure the permanent sealing of the successive traps with water, an automatic flushing-tank is placed at A. The period of discharge is not as

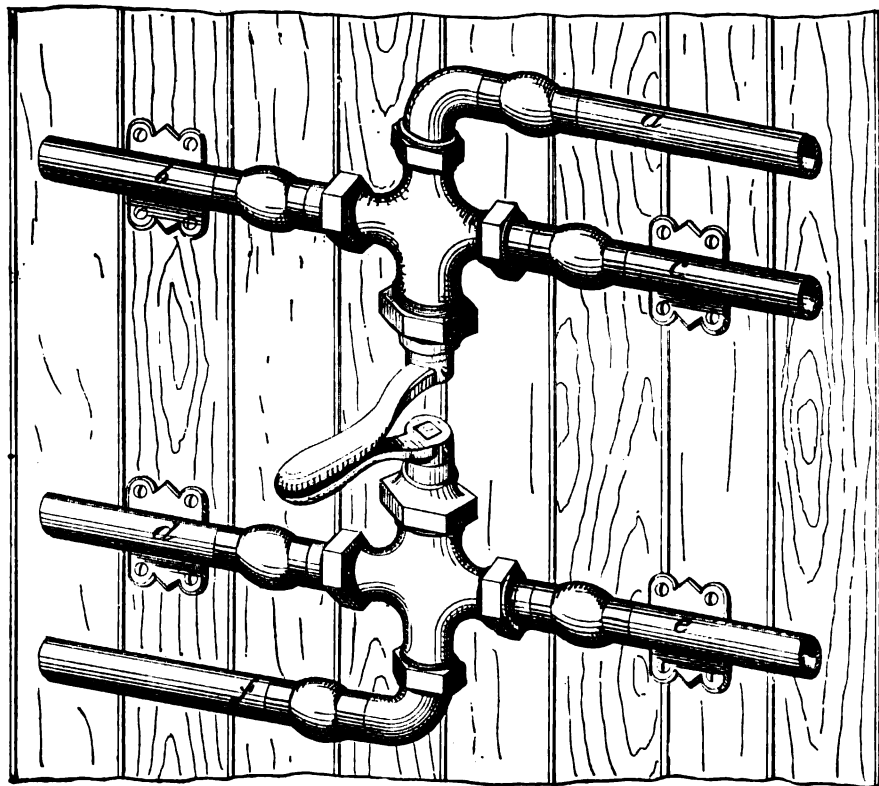


FIGURE 2.

REPORT ON GLUCOSE.

IN 1882 the Commissioner of Internal Revenue requested that a committee of the National Academy of Sciences be appointed "to examine as to the composition, nature, and properties of the article commercially known as 'glucose' or 'grape-sugar';" and information was especially asked for in regard to "its deleterious effect when used as an article of food or drink."

The committee appointed consisted of Professors G. F. Barker, William H. Brewer, Wolcott Gibbs, C. F. Chandler, and Ira Remsen, and their report was presented early in the present year.

In commerce the term "glucose" is applied to the liquid product, and "grape-sugar" to the solid product obtained by treating starch with an acid.

It was prepared from starch by Kirchhoff in 1811, and in 1819 Braconnot prepared it from vegetable fibre.

In France and Germany potato-starch is the only available material for the manufacture of sugar, but in this country Indian corn is employed.

The process of manufacture consists in steeping the corn in water until soft, grinding it, and separating and washing the starch. This product is next converted into sugar by heating with dilute sulphuric acid; the excess of acid is neutralized by carbonate of lime, and the liquor is filtered and evaporated.

There are twenty-nine glucose factories in the United States, with a total capacity of about 43,000 bushels of corn per day.

The committee examined nineteen samples obtained from various factories throughout the country. "Careful research was made for tin, copper, and other metallic impurities, but none were found." The following analysis shows the composition of a sample of commercial grape-sugar:

Dextrose.....	72.0 per cent.
Maltose.....	3.6 "
Dextrine.....	6.4 "
Water.....	17.5 "
Ash.....	0.5 "

100.0

In the samples of glucose (liquid) examined, the amount of dextrose varied from 34.3 to 42.8 per cent., the maltose from 1.3 to 19.3 per cent., and the dextrine from 29.8 to 45.3 per cent.

The report also discusses the question whether glucose is injurious to health. Mention is made of the experiments of A. Schmitz, Nessler, and Freiherr von Mering. The two former concluded that the product obtained by fermenting potato-sugar contains substances injurious to health. Freiherr von Mering, on the other hand, concluded that there was nothing objectionable in this product. "It hence appears doubtful whether there are injurious substances in potato-sugar. * * * Even though it should eventually be shown that potato-sugar is or is not objectionable, it would not necessarily follow that the same is also true of maize-sugar."

The committee conducted a series of experiments with glucose similar to those of Schmitz and others with potato-sugar, and it failed to find anything injurious to health in the extracts obtained by fermentation. "In the experiments the experimenter took into his system everything that could possibly be objectionable contained in from 120 to 160 grams of the glucose, or grape-sugar—i. e., from a quarter to a third of a pound. It must be borne in mind, further, that the extract which was taken into the stomach must have contained any objectionable mineral as well as organic substances present in the glucose employed; hence, the results seem to be final as regards the injurious nature of glucose, or grape-sugar, made from maize. The conclusions are valid only for maize-sugar as furnished by manufacturers in this country. It should be further remarked that, although our experiments show conclusively that the products of fermentation of glucose are not dangerous to health, it does not necessarily follow that beer made by the fermentations of glucose is just as good as that made in the usual way."

In its concluding remarks the committee says, "that though having at best only about two-thirds the sweetening-power of cane-sugar, yet starch-sugar is in no way inferior to cane-sugar in healthfulness, there being no evidence before the committee that maize-starch sugar, either in its normal condition or fermented, has any deleterious effect upon the system, even when taken in large quantities."

The report contains, in an appendix, a large number of extracts on the subject from journal literature, as well as very complete bibliography.

ARTIFICIAL ILLUMINATION AND PUBLIC HEALTH.

AT a conference held in connection with the International Health Exhibition, Mr. R. E. Crompton read a paper, in which he set forth the advantages of the electric-light over other illuminants considered as a health question. He commences by pointing out the differences which exist between hours of work or recreation spent in daylight and under artificial light. The sunlight exercises a subtle influence on our bodies, and is necessary to enable all animal and vegetable organisms to flourish in the fullest conditions of healthful life. It furnishes heat as well as light, and these without vitiating the atmosphere. With artificial illuminants, on the other hand, we have light, but in insufficient quantities. Heat is also produced, which in proportion to the light afforded is enormously in excess of the heat given by sunlight. Artificial illuminants, with the exception of electricity, vitiate the atmosphere to a considerable extent.

The question is considered both in its relation to health generally, and also as our eyesight is affected. The various artificial lights differ very widely from sunlight in this respect, that they are all more or less deficient in the rays at the violet end of the spectrum, commonly called the actinic rays, and which most probably exercise a very powerful effect on the system. Even the light of the electric-arc, which is richer in these rays than any other, is still on the yellow side of sunlight. The incandescent electric-light is next best in this respect, after which come gas and oils.

To show the comparative heating and air-vitiating properties of artificial lights, the following table, by Dr. Tidy, was given, to which has been added the heat produced by a 12-candle incandescent electric-lamp:

Table showing the oxygen consumed, the carbonic-acid produced, and the air vitiated, by the combustion of certain bodies burnt so as to give the light of 12 standard sperm candles, each candle burning at the rate of 120 grains per hour:

Burnt to give light of 12 Candles equal to 120 grains per hour.	Cubic Feet of Oxygen consumed.	Cubic Feet of Air consumed.	Cubic Feet of Carbonic-Acid produced.	Cubic Feet of Air vitiated.	Heat produced in lbs. of Water raised 1° F.
Cannel Gas.....	3.30	16.50	2.01	217.50	195.0
Common Gas.....	5.45	17.25	3.21	348.25	278.6
Sperm Oil.....	4.75	23.75	3.33	356.75	233.5
Benzole.....	4.46	22.30	3.54	376.30	232.6
Paraffin.....	6.81	34.05	4.50	484.05	361.9
Camphine.....	6.65	33.25	4.77	510.25	325.1
Sperm Candles.....	7.57	37.85	5.77	614.85	351.7
Wax.....	8.41	42.05	5.60	632.25	383.1
Stearic.....	8.82	44.10	6.25	660.10	374.7
Tallow.....	12.00	60.00	8.73	933.00	505.4
Electric-Light.....	none.	none.	none.	none.	13.8

From these figures you will see that the air of a room lighted by gas is heated twenty times as much as if it were lighted to an equal extent by incandescent electric-lamps. When arc-lamps are used, the comparison is still more in favor of electricity. You will be surprised to see from the table that our old friend, the tallow candle, and even the wax candle, far worse than gas in the proportion of air vitiated and the heat produced; and you will be disposed to disbelieve it. But the fact is that, so long as candles were used, light was so expensive that we were obliged to be content with little of it; in fact, we lived in a state of semi-darkness, and in this way we evaded the trouble. It is only since the general introduction of gas and petroleum that we have found what an evil it is.

It is not unusual, in fact it is almost invariable, for us to find the upper stratum of air of the rooms in which we live heated to 120° after the gas has been lighted for a few hours. Looking again at the table it will be seen that each gas-burner that we use consumes more oxygen, and it gives off more carbonic-acid, and otherwise unfit more air for breathing than one human being; and it is this excessive heating and air-vitiation combined which are the main causes of injury to health from working long hours in artificial light.

Mention is made of some experiments conducted during the Birmingham Musical Festival. "The hall was lighted both by gas and electricity, the latter being in the form of clusters of lights placed on large brackets, projecting from the side walls, while the gas-lighting was in the form of several large pendants suspended down the centre of the hall. The candle-power given by the electric-light was about 50 per cent. in excess of that given by the gas-light. The degree of illumination by electricity was consequently very brilliant. It was found that when the gas was used, the temperature near the ceiling rose from 60° to 100° after three hours' lighting. The heating effect of the gas was,

therefore, the same as if 4,230 persons had been added to the full audience and orchestra of 3,100. Similarly, the vitiation of the air by carbonic-acid was equal to that given off by the breathing of 3,600 additional persons added to the above audience of 3,100. But on evenings when the electric-light was used, the temperature only rose 1½° during a seven hours' trial; and the air, of course, was only vitiated by the breathing of the audience. Now we all of us know that the times when we suffer most from the effect of artificial light is in crowded places of public amusement which are at the same time brilliantly lighted. Many are unable to go to the theatre, or attend evening performances of any kind, as the intense headache which invariably results through staying a single hour in such places entirely prevents us. This headache we commonly say is due to the heat and glare of the gas. Now this phrase is not strictly correct. It is, no doubt, due to the heat of the gas and its air-vitiating properties; but when we use the word glare, I believe we refer to the effect the gas-light has upon our heads, and which effect is not due to excess of light. On the contrary, I believe if a far greater amount of light be given by the electric-light without the heating and air-vitiation being present, such headache is never produced, although some of the more tender-hearted among us will at first complain of the glare because we are habituated to associate with plenty of light, great heat, great air-vitiation, and other evils."

Speaking of the effects of artificial lights on the eyesight, he said that healthy eyesight demands a plentiful supply of light. "It is the greatest mistake to suppose that a state of semi-darkness is good for our eyes, unless they are defective or recovering from the effects of past injury or disease. I think I have the authority of oculists when I say that nineteen-twentieths of the diseases of the eye arise from working long hours with insufficient light. Again, another great cause of injury to eyesight is the unsteadiness of most artificial lights."

Referring to the arc and incandescent electric-lamps, he said both had their proper places. The arc-light, which is whitest in color and most economical to produce, is not so steady as the incandescent-lamp. It is therefore unsuitable for indoor use where a maximum of steadiness is required; but it is well suited for the lighting of large buildings and public places.

THE summer meeting of the Institution of Mechanical Engineers of Great Britain commenced at Cardiff, Wales, on the 5th of August. The President of the Institution, Mr. Isaac Lowthian Bell, F. R. S., delivered his address before a large assemblage. He referred to the advances which had been made in the iron and steel trades, and went on to say that, bearing in mind the immense strides which the art of producing iron had made in the last twenty-five years, the consumer might be tempted to inquire as to the prospects of further improvements being made in the quality as well as in the cost of production. He drew a comparison between the cost of building iron ships in Norway and that in Great Britain, and said that after paying ten shillings per ton freight on iron bought in England or Scotland, the Norwegians could construct the hull of a vessel for fifteen shillings per ton less than she could be built in Great Britain for, in consequence of the high rate of wages paid by northern ship-yards.

The following papers were offered for reading and discussion, after the address of the president: On recent Coal-Shipping Machinery at the Bute Docks, Cardiff, by Mr. John McConnochie, of Cardiff; Description of the new Locomotive Running Shed of the Taff Vale Railway at Cathays, Cardiff, by Mr. Charles Hurry Riches, of Cardiff; Description of the Francke "Tina" or Vat Process for the Amalgamation of Silver Ores, by Mr. Edgar P. Rathbone, of London; On the use of Petroleum Refuse as Fuel in Locomotive-Engines, by Mr. Thomas Urquhart, of Russia; On the Causes and Remedies of Corrosion in Marine Boilers, by Mr. J. Harry Hallett, of Cardiff; On the Mineral Wagons of South Wales, by Mr. Alfred Slater, of Gloucester; On the application of Electro-Magnets to the Working of Railway Signals and Points, by Mr. Illius A. Timmis, of London.

A PROGRAMME has been issued of the arrangements for the autumn congress of the Sanitary Institute of Great Britain, which will be held at Dublin, on September 30, and following days, under the presidentship of Sir Robert Rawlinson, C. B. The Secretary states that "the council invite papers on subjects mentioned in the programme, and will be very glad to receive the personal co-operation and support of all who are interested in the diffusion of sanitary knowledge."

THE BRITISH SCIENCE ASSOCIATION.

THE fifty-fourth annual meeting of the British Association for the Advancement of Science opened in Montreal on August 27 and continued to September 3. Among the eminent British scientists present were Prof. Sir William Thomson, of Glasgow, the Right Hon. Lord Rayleigh, Sir W. J. Bramwell, Sir Henry Roscoe, Prof. W. Boyd Dawkins, Captain Douglas Galton, Admiral Sir Erastus Ommaney, the Right Hon. Sir John Macdonald, and A. G. Vernon-Harcourt. By invitation, many Fellows of the American Association for the Advancement of Science were present as honorary members.

Addresses of welcome were delivered by the Governor-General, Lord Lansdowne, and the Mayor of Montreal.

The President of the Association was Lord Rayleigh, Professor of Experimental Physics in the University of Cambridge. His address was a review of the recent progress made in physics. In speaking of electrical progress, he said: "One of the most striking advances of recent years is in the production and application of electricity upon a large scale. The dynamo-machine is indeed founded upon discoveries of Faraday, now more than half a century old; but it has required the protracted labors of many inventors to bring it to its present high degree of efficiency. Long ago it was recognized that electricity derived from chemical action is (on a large scale) too expensive a source of mechanical power, notwithstanding the fact that (as proved by Joule in 1846) the conversion of electrical into mechanical work can be effected with great economy. From this it is an evident consequence that electricity may advantageously be obtained from mechanical power; and one cannot help thinking that if the fact had been borne steadily in mind the development of the dynamo might have been much more rapid.

"The present development of electricity on a large scale depends, however, almost as much upon the incandescent-lamp as upon the dynamo. The success of these lamps demands a very perfect vacuum—not more than about one-millionth of the normal quantity of air should remain—and it is interesting to recall that, twenty years ago, such vacua were rare even in the laboratory of the physicist. Looking forward to the future of electric-lighting, we have good ground for encouragement. At present we have no experience of a house-to-house system of illumination on a great scale and in competition with cheap gas, but preparations are already far advanced for trial on an adequate scale in London. In large institutions, such as theatres and factories, we all know that electricity is in successful and daily extending operation. When the necessary power can be obtained from the fall of water, instead of from the combustion of coal, the conditions of the problem are far more favorable."

Speaking of the steam-engine, and its possible rival—the gas-engine—he said: "Without doubt the most important achievement of the older generation of scientific men has been the establishment and application of the great laws of thermo-dynamics, or, as it is often called, the mechanical theory of heat. The first law which asserts that heat and mechanical work can be transformed one into the other at a certain fixed rate, is now well understood by every student of physics. The second law teaches us that the real value of heat as a source of mechanical power depends upon the temperature of the body in which it resides—the hotter the body in relation to its surroundings the more available the heat. In order to see the relations which obtain between the first and second law of thermo-dynamics, it is only necessary for us to glance at the theory of the steam-engine. Not many years ago calculations were plentiful, demonstrating the inefficiency of the steam-engine on the basis of a comparison of the work actually got out of the engine with the mechanical equivalent of the heat supplied to the boiler. Such calculations took into account only the first law of thermo-dynamics, which deals with the equivalents of heat and work, and have very little bearing upon the practical question of efficiency, which requires us to have regard also to the second law. According to that law the fraction of the total energy which can be converted into work depends upon the relative temperatures of the boiler and condenser; and it is, therefore, manifest that as the temperature of the boiler cannot be raised indefinitely, it is impossible to utilize all the energy which, according to the first law of thermo-dynamics, is resident in the coal. On a sounder view of the matter the efficiency of the steam-engine is found to be so high that there is no great margin remaining for improvement. The higher initial temperature possible in the gas-engine opens out much wider possibilities, and many good judges look forward to a

time when the steam-engine will have to give way to its younger rival."

In his closing remarks the speaker said that without encroaching upon grounds appertaining to the theologian and the philosopher, the domain of natural science is surely broad enough to satisfy the wildest ambition of its devotees. Increasing knowledge brings with it increasing power, and, great as are the triumphs of the present century, we may well believe that they are but a foretaste of what discovery and invention have yet in store for mankind.

The following are the various sections, with the names of the presiding officers: A. *Mathematical and Physical Science*, Prof. Sir William Thomson. B. *Chemical Science*, Prof. H. E. Roscoe. C. *Geology*, Mr. W. T. Blandford. D. *Biology*, Prof. H. N. Moseley. E. *Geography*, Sir J. H. Lefroy. F. *Economic Science and Statistics*, Sir R. Temple. G. *Mechanical Science*, Sir F. J. Bramwell. H. *Anthropology*, Prof. E. B. Tylor.

It is probable that many of the English scientists present at Montreal will also attend the meeting of the American Association for the Advancement of Science, which opens in Philadelphia September 4.

THE POLLUTION OF THE WATER OF THE SCHUYLKILL RIVER.*

(Special Correspondence of THE SANITARY ENGINEER.)

PHILADELPHIA, August 28, 1884.

A HEARING in the cases of the pollution of the Schuylkill River, referred to in my letter last week, was held before Magistrate Smith on August 25, the city being represented by District-Attorney Graham and City-Solicitor Warwick. The latter said that on July 2 Chief Ludlow, of the Water Department, sent a communication to City Councils setting forth the pollution of the water by the factories, and councils referred the matter to the City-Solicitor, and hence the present steps against the defendants.

The case of C. W. & G. Soulas, of Riverside Mansion, was first called, and Colonel Ludlow, Chief of the Water Department, in answer to inquiries, said:

"One-half of the entire amount of the water-supply is affected by the flow of filth from these places. We do nothing to purify the water beyond allowing a partial subsidence after it goes into the reservoir. The water is undoubtedly polluted when it reaches the people."

Engineer Dana C. Barber, of the Water Department, said of Riverside Mansion:

"The daily number of visitors sometimes reaches as high as 600 persons. The closets drain directly into the river through an underground pipe, of which the lower end passes into the river wall. A volume of water too large to be absorbed from a well or cesspool was found to run through the closet, and, apparently, about the same quantity of water runs through a pipe in the face of the river wall opposite."

Dr. Albert R. Leeds said that such matter as was drained into the river would prove injurious to the health of consumers in the city, notwithstanding the fact it was compelled to travel two miles to reach the first pumping-station.

Chief-Clerk W. P. Troth, of the Health Board, read a resolution of the board declaring the place a public nuisance.

Magistrate Smith ruled that the resolutions had no effect in the present cases. The accused were charged with maintaining a nuisance, and he would hold them in \$800 bail for court.

The action of the Board of Health above referred to was taken on Saturday, August 23, when the report of Medical Inspector J. Howard Taylor, M. D., was submitted to the board. He says he inspected the Riverside Mansion, Stelwagen's Mill, Preston's, Fitzpatrick's Mills, and repeats the substance of Mr. Barber's report. Dobson's Run, he says, near the Falls bridge, discharges into the river annually the scourgings from 13,000,000 pounds of wool, which would probably aggregate 2,000,000 pounds of solid animal matter, and adds: "This, in connection with the waste dye-stuff and house-sewage, swells the pollution to an amount truly appalling. It is quite unnecessary to speak, in this connection, of the pernicious effect of so large an amount

[* Our correspondent in his last letter omitted to mention that a special examination of the pollution of the Schuylkill was made some two months ago by direction of Colonel William Ludlow, Chief Engineer of the Water Department, and that the report of this investigation was subsequently submitted by him to the Councils, accompanied by a report setting forth the great danger from such pollution and the importance of immediate action. After the matter had passed into the hands of the City Solicitor the Chief Engineer courteously detailed his assistant, Mr. D. C. Barber, to make a special report of the worst existing cases, and it is on this report that the present action is based.—ED. SANITARY ENGINEER.]

of animal matter in our drinking-water upon the general health. These facts are too well known to need repetition and the evil is of too long standing to need further discussion."

A letter was also read from Dr. Charles M. Cresson, the well-known chemist, in which he says the germs of the typhoid fever and cholera are found chiefly in animal refuse; that the lives of the people of the city are endangered by the pollution of the water they drink, and urging the taking of decided action to prevent the emptying of the sewage into the river.

The Board of Health then adopted unanimously the following resolution, and ordered a copy to be sent to the City Solicitor:

"Resolved, That the drainage arrangements of Riverside Mansion, Wabash Mills, Stelwagen & Sons' Mills, the cotton and woolen mill of Fitzpatrick & Holt, by which the sewage from said establishment is permitted to flow into the Schuylkill River, the main source of the city's water-supply, be and the same are hereby declared to be nuisances prejudicial to the public health; and that the owners or agents of the said premises be and they are hereby notified and required within ten days to have said nuisances abated by diverting the sewage of said premises from the river to water-tight receptacles or to dispose of it by some such approved method as shall prevent the drainage from running into and polluting the river."

The Water Committee of Councils held a special meeting on August 26, to consider the resolution of councils, directing the City Solicitor to prosecute the parties polluting the water. Colonel Ludlow appeared before the committee and urged the necessity of immediate action, reviewing the report of the expert, and addresses were made by the mill-owners and persons interested.

Dr. Trite said the action of the City Solicitor was rather unfair in making a sudden attack on the manufacturers and in bringing them into court. He thought the proper way would have been for the City Solicitor to notify them, and give them time to abate the nuisance. He thought it advisable to make immediate arrangement for the disposal of the water-closet drainage, and to do away with, as soon as possible, the other offensive matter, so as not to pollute the water. The committee, however, took no action on the subject.

POWERS OF THE STATE BOARD OF HEALTH.

THE Attorney General has rendered the following opinion and answer to the communication from P. B. Porter, M. D., of Southampton, L. I., referred to him by the State Board of Health:

"P. B. Porter, M. D., Southampton, L. I.

"ALBANY, N. Y., August 25, 1884.

"DEAR SIR—Your communication of the 17th instant to the State Board of Health has been referred to this office for opinion and answer. The case presented seems to be made up of the following facts: A man has leased a part of a swamp within the limits of the village of Southampton, erected a dwelling thereon and moved his family into the same; he has several children; since taking up his residence there one of his children has died. It is stated that the site is an unfit one for human residence.

"The question to be answered is, Can the man be compelled to remove his family from the place, and has the local Board of Health power to make or require such removal?

"The power of boards of health extends to the suppression of actual nuisances and to the prevention of malignant and infectious diseases. Every man has an inherent and constitutional right to the enjoyment of his own property and the management of his own affairs as he sees fit, subject only to the condition or restriction that he shall not thereby interfere with the same rights of other men or the safety of the public. It may be said in general terms that where the element of positive criminality or immorality does not enter into individual action, the public at large has no concern with the way a man lives, unless the public peace is disturbed or the public health jeopardized thereby. The powers given to boards of health do not in any wise abrogate the right which every man has to insist that all controversies in which his liberty or property is concerned shall be determined by the verdict of a jury of his peers. Therefore, whenever boards of health proceed to action, even if they proceed honestly, they are by no means relieved from liability as trespassers if it shall be determined by a jury that their action was in reality unwarranted or extreme.

"Unless the Board of Health of Southampton has well-grounded reasons for believing that the living in this place by this man's family is a source of immediate danger of some malignant and infectious disease or of other danger to the public health, they have no right to interfere.

"It occurs to me that this marsh in itself may be a nuisance. If it is such the local Board of Health has power to cause it to be drained. Furthermore, if the father of this family has manifested any willful desire or intent to endanger the life or health of any of his children, he is liable, under the statutes of this State, to be punished for misdemeanor.

Very respectfully yours,
"D. O'BRIEN, Attorney General."

THE INTERNATIONAL HEALTH EXHIBITION. No. XV.

(Continued from page 293.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

In the Western Gallery, among the machinery in motion, Mr. A. H. Kuhlman, of 23 Great Street, Helens, E. C., London, presents exhibit No. 1,131, as seen in illustration, Fig. 1.

It is an improved cement-testing machine, which occupies small space. Upon a column of cast-iron (*a*), sixteen inches in height, are fixed two levers (*b* and *c*), the leverage of the upper and longer lever being 1 to 10, and that of the lower and shorter lever 1 to 5; the total leverage being 1 to 50. Each lever has three knife-edges. The upper lever is provided with a sliding weight for balancing and securing the correct position of the levers, which is indicated by a mark on the catch fastened to the top of the pillar; on the lower, a smaller lever, is fixed one of the clamps for holding briquettes, the other clamp being attached to the base of the column, and made adjustable by means of a screw and wheel (*d*). The clamps are a new shape of brass molds, with which it is claimed good results are obtained. At the time of testing, the briquette is taken out of water, in which it should be for about seven days before testing, and placed in the clamps, which should fit exactly to the sides of the briquette, care being taken that the upper clamp is exactly over the under one, and that their ends are horizontal and parallel.

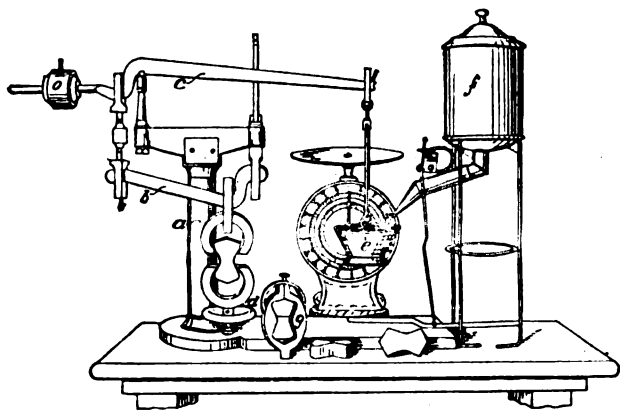


FIG. 1.

The bucket or pan (*e*) is then hung on the long lever, in which fine shot (No. 6) is slowly poured from a self-acting shot-run (*f*), which is fitted beside the apparatus on the platform. The breaking strain is exactly fifty times as great as the weight of the bucket and shot, and the result can be seen without calculation by a scale attached to the platform.

The machines are made of steel and are nickel-plated, and consist of the machine itself, six brass molds, a self-acting shot-run, a scale, a bucket, a can, and a platform.

SOUTH ANNEX.

Mr. R. R. McKees, 341 Port Brae, Kirkcaldy, Scotland (stand 484), exhibits full-size models of his patent drain-flushing apparatus. The arrangement shown is one modification of his principle, and is intended for the flushing of drains at stated or fixed intervals. It can be worked by rain or spring water, but is not intended for sewage. They are made in sizes from ten inches upward. (See Fig. 2.)

Water from the street-main is allowed to flow continuously through a small pipe, *a*, to fill the large tank or holder, *A*. When the tank is filled, the water raises a float, *B*, tilts a lever, *b*, and releases a lower float, *C*, which is pivoted on two cocks, *c*, *c'*, fitted on inlet and outlet tubes, *D*, *D'*, connected to cylinder *E*. The lower float *C* rises to the dotted position, and, in doing so, opens the cock and shuts the other. By this action the water is admitted to the cylinder *E*, and the piston and piston-rod *F* are raised, and thereby draw open the large outlet-valve *G*. The contents of the tank are thus suddenly discharged into the drain or sewer *H*.

When the tank is emptied, the float *C* falls, and, by closing the cock *c* and the cock *c'*, at one operation shuts off the supply of water to the cylinder *E*, and thus allows the water in the cylinder to escape by the outlet *D'*. The piston then falls, and closes the large outlet-valve *G*, and the tank is again filled. A dash-pot arrangement, *I*, is provided, to prevent the piston falling and the valve being closed before the tank is emptied.

The whole apparatus is inclosed within the tank, and is fixed to it by a wall-bracket, as shown.

By regulating the cock on the admission *a*, the apparatus can be arranged to flush the drains once a day, once a week, or at greater or lesser intervals.

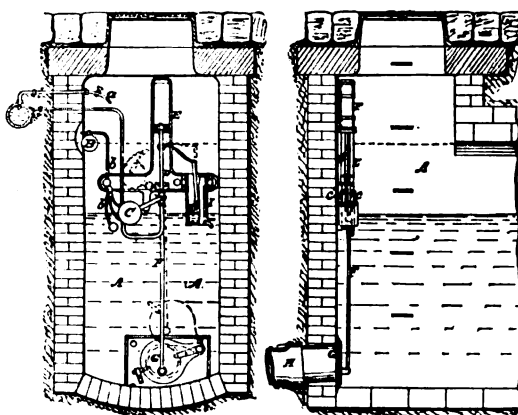


FIG. 2.

EAST AND WEST QUADRANTS.

We cannot undertake to mention the various exhibits in the East Quadrant. Every variety of covering for the head and feet and for the body is here represented, and, in many cases, the raw material as well.

The importance which "cycling" has acquired is shown by the considerable number of garments, foot-coverings, etc., specially designed for those devoted to this form of exercise, both males and females. Various sorts of water-proof clothing for hunting, fishing etc., etc., are also exhibited.

John Bell, 118 Southwark Street, S. E. (Exhibit No. 326), shows a variety of fire-proof garments, caps, gloves, etc., made of asbestos; also, asbestos cloth, paint, coating for steam-pipes, etc., etc.

No. 327. The Fleuss Breathing-Dress and Safety-Lamp Company, 27 Martin's Lane, Cannon Street, E. C., exhibits the Fleuss apparatus for diving, both in deep-sea and in shallow water. The deep-water diving-dress is fitted with a helmet such as is commonly used by divers, but no air-pump or tubes are required, and in shallow water the helmet is also dispensed with. A breathing-dress is also constructed for use in mines, enabling the wearer to enter a mine full of choke-damp, fire-damp, or immediately after an explosion, without fear of suffocation. The principle on which the apparatus is constructed involves a cylinder of compressed oxygen-gas, which is gradually delivered within the helmet or mask, and the expired air is passed through a filter containing caustic-soda to take out the carbonic-acid and enable the air to be breathed again with the addition of as much oxygen as may be necessary. One of the diving-dresses is represented with a telephonic attachment, enabling communication to take place between the diver and those above. A safety-lamp is also exhibited which is constructed on the same principle. The compressed oxygen plays through a spirit-flame from a small jet on a ball of lime, producing a lime-light. The hot air is carried into water contained in a double casing at the top portion of the lamp.

In the East and West Quadrants, or in the immediate neighborhood, are in operation a number of processes illustrating the manufacture of articles of dress. Of these we call attention to a few of the most prominent.

Messrs. Dent, Allcroft & Co., 97 Wood Street, London (Exhibit No. 337), show in actual operation the essential processes in the manufacture of gloves from the skin. Processes that cannot be carried on practically in the exhibition building are shown by photographs.

Messrs. Henry Mann, Son & Company, Manchester (Exhibit No. 228), show "The Nonpareil Velveteen" in various stages of manufacture, and also some of the processes in actual operation.

Henry Heath & Company, 105 to 109 Oxford Street, W. (Exhibit 1197), show the various processes employed in the manufacture of silk and felt hats. We notice here a ventilating device by which an exhausting fan draws away from the operators the dust and particles of hair which were formerly inhaled by the workmen, and were the cause of consumption among this class of operatives. Other exhibitors show sewing, weaving, and knitting machines, in various sizes and patterns.

In the East Quadrant, Mr. James Stantin, 16a Sackville Street, Piccadilly, exhibits a case of colored gloves, stock-

ings, and other articles worn in contact with the skin, and which are known to have actually produced injury to the wearers. These articles are accompanied, in each case, by a particular statement with reference to the individual injury. Samples of the poisonous (aniline) dyes are shown, and together with them are shown samples of non-poisonous colors, and stockings, gloves, etc., dyed with the same.

WESTERN ARCADE.

The Aquarium is a very attractive feature to the ordinary visitor, and was constructed for the International Fisheries Exhibition, held last year. The sea-water originally obtained for the salt-water fishes has not been changed at all, having been kept bright and pure by the "circulating and aerating" system of Messrs. Leete, Edwards & Norman, 366 and 368 Euston Road, N. W. The rotary pumps employed for the purpose are constructed of vulcanite and are stated to have been running continuously by day and by night since April, 1883.

At the north end of the Aquarium the Atkins Water-Softening and Purifying Company, London, has a plant for softening and filtering hard-water, which is not in operation, or which is so arranged that the internal construction is not visible.

WESTERN GALLERY.

Distillation of Water.

Normandy's Patent Marine Aerated Fresh-Water Co. (Limited), Custom-House Station, Victoria Docks. (No. 1,159.) Among the processes in use for distilling sea-water and condensing the steam so as to furnish potable water, Normandy's holds a conspicuous place. A very large number of vessels belonging to the British and to other foreign governments, as well as many Atlantic and coasting steamers, are fitted up with this apparatus, two different sizes of which are on exhibition in actual operation. It is claimed that with this apparatus from eighteen to twenty-three tons of distilled water can be produced for each ton of coal consumed.

Clements, Jeakes & Co., Great Russell Street, London (Stand No. 936), have an exhibit in which there is a spray and shower-bath made of brass tubes set on a tile floor and surrounded by a marble wall 4'6" high and 6" thick, and various specimens of marbleized-copper baths.

Thomas Waller & Co., of The Grove, Southwark, London (Stand No. 935), exhibit a handsomely fitted-up spray and shower-bath.

Samuel Owen & Co., 57 Faun Street, London (Stand No. 932), exhibit a metal bath in the head of which a ledge for a seat is constructed.

RECORDING-GAUGES FOR THE BOILERS OF STEAM-VESSELS.

THE recent agitation on the subject of recording-gauges for the boilers of steam-vessels has directed our attention to the fact that there are several recording steam-gauges now made, some of which it seems might be found to comply with the requirements of the Steamboat Inspectors. One is an ordinary pressure-gauge that simply shows on a small dial the number of times the index of the gauge has been above any certain point that the gauge may be set for, say 50 per square inch. This records "each excess of steam," and a loose or secondary index which has been carried to the maximum point attained and left there by the receding primary index records the "highest point attained." This, under the strict interpretation of the law, appears to be all that is required.

Of course it does not inform the inspector at what hour or day the infringement or neglect occurred, but nevertheless it will show there was a dereliction of duty between the times of inspection, their number, and their greatest extent. It may be claimed for it that a mechanic can take it asunder and get the recording apparatus back to zero, but a "lock-up" mechanism or a seal should obviate this objection.

Then there is three or four gauges of a class that records on a passing paper the fluctuations of pressure. We know of three manufactured in this country and one in England. They all show the pressures and times at which changes occur. The paper on one of these may be made to last three months; the others must be put on daily. The one on which the paper can be made to last three months, we presume, might also be made to last three months with but one winding, and we think the others can be made to record for a longer time than twenty-four hours without attention.

This class of gauges records the prescribed pressure and all pressures either above or below it that may be carried, and the times when all changes occur. An advantage this class of gauges also appears to have is that by it may be determined the watch in which any infractions of the rules occur, and in cases of divided responsibility bring home to the delinquent the proof of his guilt.

HEALTHY FOUNDATIONS.

No. XII.

BY GLENN BROWN, ARCHITECT.

"He who builds a fair house upon an ill seat committeth himself to prison."—BACON, vol. i., page 49.

(Continued from page 242.)

Concealed Area.—A convenient concealed area may be built after the main wall is carried up. The concrete foundation should be extended about three feet beyond the foundation-wall, and on this a nine-inch or one-brick thick wall may be carried up to within a short distance of the surface, when an arch should be sprung from it to the foundation-wall. The top of the brick forming this arch may be cut or molded so as to form a water-shed and throw the surface-water away from the building.

The top of this brick-work must be covered with asphalt or cement and sand.

The open space between the two walls should be at least large enough to allow a man to enter, as the additional expense would be small, and the convenience, at some time, might be great.

The concrete must be graded toward the centre and coated with cement or asphalt. Beneath the centre or lowest point in the drain a tile-drain must be laid to carry off all the water that might come through the area wall.

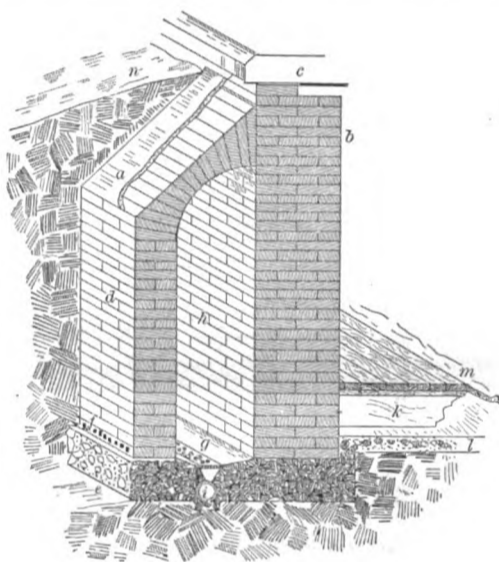


FIG. 44.—CONCEALED AREA.

a, Water-shed, cemented; b, main wall; c, damp-proof stone; d, area-wall; e, tile-drain; f, perforated tile; g, area bottom, iron grating; h, area; i, concrete floor and footings; k, joists; m, double floor, tar-paper between them; n, surface of the ground.

It is always advisable to provide for the passage of water through an area-wall instead of damming it up by the wall.

The perforations in the damp-proof course answer both to let water and air through the wall. Although there is very little danger of dirt getting into a concealed area, still it is well to cover the gutter with a cast-iron perforated

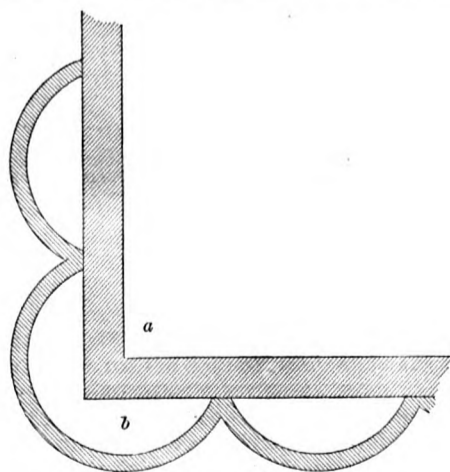


FIG. 45.—PLAN OF AREA FORMED BY ARCHES.

a, Wall; b, area.

grating, as it will prevent rats and mice from entering the drain. Concealed areas must have two or more openings into the outside air, so that a circulation of pure air may take place through the area, and through which any ground air can pass into the pure air on the outside of the building.

Concealed areas should have a manhole through which they can be inspected from time to time.

Areas are sometimes built in the form of a number of small arches. A very thin area-wall may be built in this way, as the arch abuts against the wall of the building. Although this form of area is used in England, it is objectionable on account of the corner, which would be hard to clean. (Fig. 45.)

Open Areas.—An open area is nothing more than a low retaining-wall built against the side of the cut, two or more feet from the foundation-wall. An area of this kind forms a complete protection for the wall against moisture or dampness that might come from the bank of earth piled against the wall. An open grating may be placed over an open area of this kind by letting it fit in rebates made in the coping of the dwarf-wall, and in the stone belt of the foundation-wall.

Open areas are always to be preferred to concealed ones. They are open to the purifying action of light and air. Being constantly under the eye, they will be kept clean by a careful housewife. Concealed areas being out of sight are generally out of mind. Vermin delight to congregate in dark places when they dare not show themselves in places open to the light of day.

Cellar Floors.—The common method of laying a brick pavement in sand or lime-mortar offers no impediment to either water or air. Bricks laid in cement-mortar and covered with a coating of the same are better, while bricks laid on in asphalt-mastic, and covered with it, forms an excellent cellar bottom. The bricks protect the asphalt, while the asphalt prevents either moisture or impure air from entering the building.

All cellar floors should be concreted with a coating of concrete from three to six inches thick, according to circumstances.

The concrete must then be finished with a coating of cement-mortar or asphalt-mastic. The concrete should be made in the same manner as that described for footing-courses.

Asphalt.—Contractors sometimes attempt and sometimes commit an imposition by using vegetable-pitch, gas-tar combined with chalk, and other compositions, in the place of asphalt.

Asphalt is a mineral pitch found practically, although not chemically pure in nature. It has been used from the earliest times for the purpose of protecting substances or bodies from air and water. The Egyptians, probably more than three thousand years ago, used asphalt to protect their mummies.

A limestone impregnated with asphalt is used in France instead of the simple substance. In Washington City, where the number of square yards of asphalt pavement exceeds that of all the other cities in the world combined, the following formula has been found to make the best mastic:

* Asphaltic cement (refined Trinidad asphalt, 100 parts; petroleum oil, 20 parts).....	15 to 18
Limestone powder.....	15 to 17
Sand.....	70 to 65
	100 to 100

This coating neither cracks in cold weather (10°) or becomes soft in hot weather (160° Fah.), in the sun.

Asphalt is found to be far superior in durability to any of its substitutes.

Floors.—Where it is necessary or desirable to have the cellar floor boarded over, as is the case when this part of the building is to be used as a basement, the flooring is sometimes laid directly on sleepers imbedded in the concrete. (See Fig. 34.) The only feature which a floor of this kind has to recommend it is, that rats and mice cannot find a playground beneath it. Where the joists are raised above the concrete covering, and perforated damp-proof tiles (Fig. 46) are built into the wall, a circulation of air will take place beneath the floor.

All basement floors are best laid double, with two thicknesses of tarred-paper between them.

When the joists are not bedded in the concrete, small strips may be nailed to the side of the joists one-third of the way from the top, and pieces of board sawed so as to rest on them. In this manner a false floor is formed, with a space two or three inches deep between it and the top floor. This space should be filled with mineral-wool, a material prepared by passing superheated steam through ordinary iron slag. It has the appearance of white wool, and weighs very little in comparison with its bulk.

It is said, on good authority, to be death to insects that enter it. This material is fire-proof, and a non-conductor.

Mineral-wool is liable to decay where it becomes wet, and as it absorbs and retains moisture, it should not be used in damp places. These spaces may be filled with asbestos, as it forms a good non-conducting material.

Roof-Water.—It seems scarcely necessary to say that water from the roof should not be allowed to fall from the eaves to the ground, as it would run into the ground against the foundation-wall. It should always be carried off in properly constructed gutters and down-spouts.

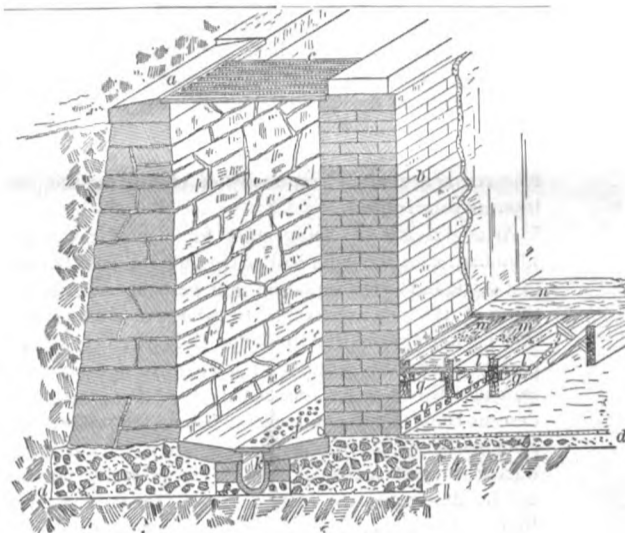


FIG. 46.—OPEN AREA.

a, Coping; b, main wall; c, grating; d, concrete; e, flagstones; f, perforated-iron cover; g, joists, ventilator beneath; i, straps on joists; k, horseshoe-tile; l, false floor; m, asbestos filling or packing; n, floor.

The down-spouts should, when there is a drainage system, be carried into the disconnecting-trap between the drainage and sewerage systems. When the down-spout connects directly with the sewer it should have a deep trap, and be carried up, of cast-iron with lead-calked joints, or of wrought-iron with screw-joints, to a point above the roof of the building. With the ordinary tin or zinc-coated iron down-spouts there are always outlets for sewer-air, and, as the trap may lose its seal by evaporation, the sewer-air would be drawn into the house through the windows.

The Coliseum affords an interesting example of the methods employed by the ancients to drain off rain-water.

According to Edward Cresy,* fifty-six of these drain-pipes, or, more properly, down-spouts, remain in the thickness of the Coliseum wall. These conduits, about twelve inches in diameter, were hollowed from the middle of large masses of freestone twenty inches high and alternately jut-

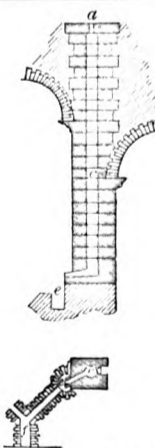


FIG. 47.—SECTION AND PLAN OF DOWN-SPOUTS IN COLISEUM.

a, Capstone; c, down-spout or drain; e, catch-basin; f, sewer.

ting out into the wall, so as to bond with the other parts of the masonry (Fig. 47).

"The upper end of each stone is cut in the form of an inverted cone, while the bottom is level." In this way water was prevented from entering the masonry through the joints. The top of these conduits were capped by a large stone, decidedly dish-shaped on top, with a small hole two inches in diameter passing through it into the conduit.

In this way all the seats and galleries were drained. The water passed off into gutters and thence through small brick or stone drains into the large sewers for which Rome is famous.

THE END.

*Encyclopedia of Engineering, Edward Cresy.

THE INTERNATIONAL ELECTRICAL EXHIBITION.

(From an Occasional Correspondent.)

PHILADELPHIA, August 30, 1884.

I TOOK a hasty trip through the building of the Franklin Institute International Electrical Exhibition this morning, and found preparations nearly completed for the opening next Tuesday, September 2. While some exhibits will not be completely arranged by that time, there will certainly be enough to make a great attraction. The exhibition will be formally opened and the machinery started at noon of that day by some high civil officer—probably the Governor of Pennsylvania. Addresses will be made by the President of the Commission and others, and the day promises to be one of great interest.

Brief mention of some of the largest and most striking features and exhibits, especially of electric-lighting, may interest your readers.

Arrangements are being made for a most extravagant illumination of the main hall of the building, and the flood of electric-light here produced will probably surpass anything of the kind ever seen. In the centre is a large fountain having twelve jets from the circumference, directed upward toward the centre at an angle of forty-five degrees, each of which is to be illuminated by a Bernstein incandescent-lamp of 120 candle-power behind the orifice. The illumination of the jets will extend over the curve, producing complete arches of light. Ten powerful reflectors will be directed on the fountain from the galleries, while from each of the fifteen arched-roof trusses above will be suspended nine arc-lamps of 1,000 candle-power each. On the outside two towers will each have arc-lamps amounting to 24,000 candle-power.

The largest exhibitors of arc-lights will be the Van Derpoole Electric-Lighting Co., of Chicago (95 lamps), and the United States, Brush, and Thomson-Houston companies, and of incandescent-lights, the Edison and United States companies, the former having about 1,600 lamps in all. Mr. Weston will have a large personal exhibit illustrating his experiments.

The United States Government exhibit will consist principally of light-house appliances, including a tower-light of a million candle-power to be directed across the river to the heart of the city.

Among other branches of exhibits, two of the most extensive are that of the Bell Telephone Co. and that of Queen & Co., manufacturers and importers of electrical instruments, representing the leading houses of England and the continent. Except the latter exhibit, there is very little from outside the States.

The building is said to be thoroughly furnished with electric fire-alarm apparatus, thermostats, etc., and other applications of electricity.

In the old Pennsylvania Railroad station, connected with the exhibition building by a bridge, will be held the meetings and lectures. Here also is the memorial library, a collection of works on electricity contributed on this occasion to the Franklin Institute. Many thousands of volumes have already been received from Europe, and, when complete, it will probably be the largest collection of books on this subject in the world.

But few of the foreign delegates and visitors have yet arrived, most of them being at Montreal, attending the Science Association meeting. Preparations for the entertainment and convenience of the visitors are going forward rapidly, though quietly. One convenience to the stranger came to my notice the other day—the preparation of a special edition of a pocket hand-book of the city, with new map, showing the places of greatest interest, to be given to each delegate on his arrival.

THE American Institute of Architects is to hold its eighteenth annual convention in Albany, N. Y., beginning October 22 and lasting four days. The programme as arranged provides for the reading of papers on architecture; their discussion; visits to the public buildings and to points of historical interest, including the Manor House, the Schuyler Mansion, and the Van Rensselaer Mansion. It is the intention of the committee to invite connoisseurs in art and other gentlemen to be present. The session will end with a dinner.

THE fortieth annual session of the American Institute of Engineers will be held in Philadelphia during the current week.

THE Connecticut Civil Engineers' and Surveyors' Association will meet in Norwalk on September 5. A number of papers will be presented.

EXPERIMENT TO TEST THE EFFICIENCY OF COVERING WATER-PIPES.

As the benefit accruing from the covering of water-pipes with felt in recesses in the outside walls of buildings has been questioned, when the pipes are subjected to a long attack of cold with no circulation of the water, except that which can go on within the pipes themselves, we cite an experiment of Mr. Rossman's (of the firm of Mead & Rossman) which goes far to prove the value of this comparatively inexpensive precaution. Some few years since the question was mooted, when the gentleman above-named, to prove the matter to his own satisfaction, caused three similar bottles to be filled with water and placed in the area during a severe cold season. One bottle was uncovered, one had thick brown paper pasted on it, and one was covered with a thickness of three-quarters of an inch of hair-felt sewed on. The uncovered one burst the first day; the one with the brown paper on burst on the third day, and the one covered with felt remained uninjured until the cold spell had passed. From this the gentleman reasoned, that while theoretically correct, so long as the water can receive no addition of heat it will freeze through felt if exposed for a sufficiently long time—that our periods of cold sufficient to freeze the water-pipes of a house are not sufficiently long in this latitude if ordinary precaution is taken with felt.

THE American Association for the Advancement of Science meets at the Academy of Music, Philadelphia, September 4. On the conclusion of the general session the different sections will convene in rooms assigned for their use. Judging by the number of letters of advice from members proposing to attend it is expected that the meeting will be one of extraordinary interest. A large number of the British scientists are expected to arrive from Montreal on the opening day.

BLANK FORMS FOR TENEMENT-HOUSE INSPECTORS.

BELOW is a list of the questions in the blank form, prepared by Mr. F. N. Owen under the direction of the Tenement-House Commission, and furnished to the inspectors, to be filled up by them after an examination of the premises and interrogation of the occupants. It is from these sheets the tabulation is compiled, and a knowledge of their contents will no doubt be found interesting to our readers:

FILE NO. _____
Date, _____ 188____
Inspector, _____
No. of Stories, _____
Built about how long, _____
No. of families on floor, _____
Material, _____
Single or double, _____
Owner, _____
Address, _____
Is name posted? _____
Duties of housekeeper, _____
Soil (sand, clay, rock, or made ground), _____
Street, how paved, _____
Size of lot, _____
House-fronts, _____
Width of areas, front, _____
Rear, _____
Alley, width, _____
Distance between front and rear houses, _____
Adjoining nuisances, _____
Any stable in building, _____
Any animals or fowls kept in house, _____
CELLAR, depth below sidewalk, _____
Height of ceiling, _____
How used, _____
How floored, _____
No. and size of windows, _____
Location of, _____
How occupied or used, _____
HOUSE, stairs, width, _____
Width of well-hole, _____
Fire-escapes, _____
Are windows obstructed? _____
HALLS, _____
Are they kept clean? _____
By whom? _____
Have walls settled? _____
Condition of plaster and ceiling, _____
How is roof reached? _____
Is roof door locked? _____
Are hallways obstructed? _____
Are halls lighted at night? _____
How lighted by day, _____
How ventilated, _____
ROOF, material, _____
Condition, _____
How used, _____
Flat or sloping, _____
Are chimneys in good repair? _____
Skylights tight or open, _____
Form of opening, _____
GARAGE, how stored, _____
When removed, _____
YARD, how paved, _____
Size, _____
Is it cleanly? _____
Is light obscured by clothes hung to dry? _____
Privy-vault, material, _____
No. of seats, _____
How connected with sewer, _____
How ventilated, _____
How full, _____
School sink, size and condition, _____
Distance from nearest window, _____
Any complaint of odors, _____
Water-closets, kind, _____
Location, _____

Condition, _____
Sinks, _____
How flushed, _____
Trapped, _____
Are all traps ventilated? _____
How? _____
Are waste-pipes properly jointed? _____
Are sinks improperly used? _____
WATER-SUPPLY, in yard, rooms, or halls, _____
How high does water rise by day? _____
Pumps, _____
Condition, _____
Hydrant, condition, _____
How wasted, _____
Tanks on roof, size, _____
Overflow discharges, _____
HEATING AND LIGHTING, stove, _____
Damper in pipe? _____
Does chimney smoke? _____
Is coal-gas noticed? _____
Light-shafts, how located? _____
Size? _____
End where? _____
Is bottom open? _____
Are they used improperly? _____
Size of windows opening into, _____
Are there side windows therefrom into courts or outer air? _____
Are transom-windows into hall kept open? _____
Bedrooms, how lighted and ventilated, _____
Are there any transom-windows over doors between rooms? _____

Waste-pipe Ventilated.	
Soil-pipe extended above roof.	
Soil-pipe used as Leader.	
Opening where.	
How Connected.	
Air-Inlet.	
Running-Trap.	
Condition.	
Location.	
Material.	
Size.	
House-Drain	
Soil-Pipe	
Waste-Pipe	
Rain-Leader	

Rents.	
Cause of death.	
Number of deaths within the year.	
Sickness.	
Children at work.	
Children at school.	
Occupation.	
Nationality of adults.	
Cubic contents of apartments.	
Dimensions, largest room.	
Height ceiling.	
Children.	
Adults.	
No. Rooms.	
How used.	
FLOOR.	
A	
B	
C	
D	

Summary, _____
Total occupants, _____
Adults, _____
Children, _____
No. of beggars recorded? _____
No. of saloons on block front? _____
Any signs of drunkenness? _____
Class of tenants, _____
Any sleeping in halls or yards? _____

The form covers six pages, together with a blank sheet ruled in squares, on which the inspector sketches a diagram of the lot and the general arrangement of the rooms in the building.

Spaces for six or more floors follow here.

STEAM-FITTING AND STEAM-HEATING.

BY "THERMUS."

No. XL.

(Continued from page 169.)

HORIZONTAL-BOILER SETTING.

THE "back-connection" arch in the brick setting of a horizontal-boiler is something that gives much trouble when improperly constructed. Presumably the simplest way to deal with this question is to point out the method that is self-sustaining and permanent first, and refer to the ones which should be avoided afterward. In architecture the arch is preferable to a lintel of any kind when permanency under great weight and disintegrating influences is desired. In a boiler-setting the weight is comparatively not great and need hardly be taken into consideration, but other influences tending to the destruction of the materials and structure is enormous, as we have to contend against the action of extreme high temperatures, coupled with sudden changes in temperature, which produce heaving throughout the structure and crack in the face of the materials even when they are of the most refractory kind. For this reason, aside from the fact that practice has demonstrated it, a fire-brick arch is the most permanent that can be constructed for this purpose.

The arch should spring from the side walls just above the line of the tubes, and its crown at the under side should not be higher than the water-line of the boiler, so that the back head-sheet may not be exposed to an intense heat at a point that is not covered with water. This arch should be made of beveled fire-bricks that will be exactly suitable to a circle equal to that of which the arch will be a segment. If the bricks offered or at hand are suitable to a smaller circle, they should be rejected at once, for an arch constructed of these bricks will have a greater distance between the bricks at their under edges than at their tops, making the joint between them wedge-shaped, allowing the mortar or fire-clay to fall from the joint on the least disturbance. If, on the other hand, the bricks are for a slightly larger circle, they may be used, as in that case the wedge of mortar will be in a position to remain in the joint, but withal, to get the very best result the joints should be parallel and the bricks should be as close together as it is possible to rub them with a paste of fire-clay, thoroughly filling the joint. Nor should large fire-clay tiles be used for a "back-connection" arch. Flat tiles of this description are simply a lintel on which no dependence can be placed. If they have sufficient thickness to prevent them from cracking, they will be impracticably thick, and cannot be properly burned unless they are made hollow; and should pieces of twenty inches square or thereabouts be used, they will have to be built into the back wall, which will have to be corbeled out under them for fully half their width; and after all, they will break off and fall down, leaving the red brick exposed and unsupported. Again, it is of no use using T-irons to support these tiles. The very fact of having fire-brick materials, or any other slow conductor of heat, backing or opposing an iron support or plate exposed to a fire, will hasten the destruction of such iron by preventing the passage of heat through it, thereby keeping it red all the time, or actually melting it.

For a like reason the cast-iron arch so commonly used lasts only one year or thereabouts, as the Sunday job for the boiler-setter amply attests. This arch usually has a spring of from four to six inches, being the width of the connection and long enough to rest in the side walls three or four inches. This is backed up with one or two courses of common brick, and the result is it starts the very first day that fire is applied to it to bend downward, and in a few months is burned all out of shape, with a pile of loose bricks pressing it down, the draft frequently taking a short cut to the chimney through the interstices of loose masonry. Sometimes these plates are put in flat, with deep ribs on the upper side of

them. This makes them last longer, as these flanges help to conduct away the heat from the iron and diffuse it in the mass of brick-work, but their use as a truss to the plate is of little or no service. Such contrivances as those last described are not, as a general thing, used by contractors to save expense. They are used with the hope of constructing a "back-connection" that will last, thinking that iron one and one-half or two inches thick should withstand almost all conditions. The iron alone, if unbacked with bricks, will last considerably longer than when so covered, but for general use in this respect it should not be entertained, as a continued change of cool air cannot be brought to sweep over it, and aside from that the gases of combustion should not loose any of their heat to such a purpose before passing through the tubes of the boiler.

An arch of fire-bricks turned against the end of the boiler and sprung from the back wall is sometimes used. This is wrong, because the head of the boiler is more or less movable, and because it is not considered good practice to have bricks in heavy contact with the plates of a boiler. A heavy angle-iron is sometimes used to turn an arch of this kind against. This angle-iron presenting but a small surface to the heat, and the fact of its being in a corner, so to speak, prevents it from coming down easily by being overheated.

The upper flange is close to the boiler, though it should not be against it, and this also helps it to remain at a temperature where it will not readily warp. The desire for an arch turned against an angle-iron, or a plate on edge close to the head-sheet, is because it is supposed to give an easy sweep and direction to the gases of combustion as they pass to the tubes. Whether this view is justifiable on account of necessity or not is a disputed and unsettled question. Theoretically, the longer and easier a bend is for the passage of fluids the less the resistance, but in cases where the cross section of the "back-connection" must be from three to four times what the tube area is, the advantages claimed for the arch in this position can be little or nothing compared to the general results obtained. In the case of the arch sprung from the side walls, a tie-rod with buckstaves or flanges at its ends can be used to good advantage if the side walls are light, but with walls of twenty inches or thereabouts this is not an actual necessity, as the arch is rarely more than two feet long in the direction of its axis, and should be built into the rear wall for at least one course of bricks; in fact when being built with the wall it is bonded into it, and will receive considerable support therefrom.

(TO BE CONTINUED.)

Reviews of Books.

ETUDE SUR LES EAUX POTABLES ET LE PLOMB. Par A. Hamon. Pp. 72. 12mo.

The author of this pamphlet is opposed to the use of lead for conveying and storing water under any circumstances whatever, and for conveying water favors the use of tin-lined lead pipe. He has searched the literature of the subject very thoroughly and brought together a large number of cases of lead-poisoning. We can hardly agree with the author when he would have us believe that very many cases which are diagnosed as typhoid fever, are really cases of lead-poisoning. "Typhoid fever," he says, "breaks out especially after times of great drought, in the fall, when numerous rain-storms have charged the drinking-waters with nitrites and nitrates. Can we not assert, with some show of reason, that these waters distributed through lead pipes acquire a poisonous character, such as to give rise to severe disorders which are confounded with typhoid fever?" We should say not, although we would by no means deny that the effects of lead are not infrequently misinterpreted. We notice here, and in an article in *Cosmos les Mondes*, that the author fails to represent quite fairly the results of the inquiry of the Massachusetts State Board of Health. It is true that about one-quarter of the correspondents of the board had observed cases of lead-poisoning from the use of lead pipe, but in these cases it was almost always well or spring-water which did the mis-

chief. The board was unable to find evidence of poisoning from the water-supplies of Boston, Charlestown, and Worcester, and concluded that such water as there used may generally be conveyed safely through lead. The matter has been recently very fully discussed in the columns of THE SANITARY ENGINEER by Professor Nichols.

ANNUAL REPORTS, 1883, DEPARTMENT OF HEALTH OF THE CITY OF CHARLESTON, S. C. 46 pp. 8vo. Charleston, 1884.

Dr. H. B. Horlbeck, who is both City Registrar and Secretary of the Board of Health, reports the mortality for the year as 21.10 per 1,000 for the whites, and 47.17 per 1,000 for the blacks. Of 540 deaths among the whites, 11 were caused by bronchitis, 21 by cholera infantum, 63 by consumption, 13 by diarrhoea, 10 by typhoid fever, 18 from pneumonia, and 10 from trismus nascentium.

Of the 1,286 deaths among the colored population, 8 were due to bronchitis, 42 to cholera infantum, 203 to consumption, 54 to convulsions, 34 to typhoid fever, 44 to pneumonia, and 111 to trismus nascentium.

Of the 540 deaths among the whites, 95, or 17.5 per cent., were of children under one year of age, while among the colored this percentage was 29.0.

Five hundred and sixty-four interments in burial-grounds within the city limits are reported during the year, and, as Dr. Horlbeck remarks, "the good sense of the community should show itself in limiting and at an early date abolishing this practice."

POLLUTION OF THE PASSAIC RIVER. Third annual report of Prof. Albert R. Leeds to the Board of Inspection of the Passaic River and its tributaries.

This is a report of the results of examination of samples taken at the beginning of each month at the intake of the Jersey City pumping-station, the Newark intake, from the office of the Jersey City Board of Public Works, from the Passaic River at Avondale Bridge, from the river at the Straight Street Bridge below Paterson, and from the river at Beatty's Dam above Paterson. It seems to us that in a matter as important as this water-supply, the purity of which is certainly not above suspicion, the examination of one sample a month is hardly sufficient to permit of conclusions of much practical value.

In the analyses determinations of the so-called "organic and volatile matter" and the so-called "mineral matter" have been omitted, the results of such determinations being considered to be so fallacious as to be of no value. The following table for the month of September indicates the determinations made:

SPECIMENS TAKEN SEPTEMBER 1.

	Jersey City Intake, Low Tide.	Newark Intake, Low Tide.	Jersey City Board of Public Works.	Avondale Bridge, Low Tide.
Free Ammonia:				
Parts per 100,000.....	0.0155	0.0195	0.007	0.007
Grains per gallon.....	0.0090	0.0113	0.0041	0.0041
Albuminoid Ammonia:				
Parts per 100,000.....	0.030	0.026	0.022	0.020
Grains per gallon.....	0.0175	0.013	0.0128	0.0116
Oxygen required to Oxidize:				
Parts per 100,000.....	0.22	0.31	0.23	0.34
Grains per gallon.....	0.13	0.18	0.134	0.198
Nitrites:				
Parts per 100,000.....	0.005	0.005	trace	none
Grains per gallon.....	0.00029	0.00029	....	....
Nitrates:				
Parts per 100,000.....	0.38	0.32	....	....
Grains per gallon.....	0.22	0.187	....	....
Chlorine:				
Parts per 100,000.....	3.4	0.90	7.1	0.90
Grains per gallon.....	1.08	0.52	4.14	0.52
Hardness:				
Parts per 100,000.....	4.6	6.2	4.3	5.9
Grains per gallon.....	2.68	3.61	2.50	3.44
Total Solids:				
Parts per 100,000.....	17.5	13.5	21.5	12.5
Grains per gallon.....	10.20	7.87	12.53	7.30
Silver Reduced:				
Parts per 100,000.....	0.56	0.61	0.58	0.46
Grains per gallon.....	0.33	0.36	0.34	0.27
Oxygen dissolved in 1,000 c.c.....	5.58 c.c.	5.02 c.c.	5.91 c.c.	5.91 c.c.

Similar data are given for each month in the year with the exception of July.

With reference to the dissolved oxygen, Prof. Leeds considers it to be an index to the degree to which the water is contaminated by decomposable organic substances. This is true, however, to but a limited extent, for the extent to which dissolved oxygen is used up by decomposable matters in the water depends upon the kind of micro-organisms present, and upon the influence exerted in their multiplication and growth by temperature, and other circumstances of which we as yet know little. When the amount of dissolved oxygen is very small it does indicate contamination, but the reverse is by no means true.

Professor Leeds' conclusion is that the Passaic water-supply is satisfactory as to purity, but that it might be better. Our own opinion is that the water-supply of Newark and Jersey City is at times dangerous from sewage contamination, and that the data given in Professor Leeds' tables do not furnish any definite or satisfactory evidence either in proof or disproof of this proposition.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING AUGUST 23, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.		ACUTE LUNG DISEASES.							Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.						
NORTH ATLANTIC CITIES.																									
Portland, Maine	35,000	17	25.3	9	52.9					6															10
Boston, Mass.	435,000	218	26.1	100	45.8	7		32		59	6	1	5		3	6	2	3							
Lowell, Mass.	69,000	33	24.9	15	45.4	3		3		13															1
Worcester, Mass.	67,000	40	31.1	22	55.0	1	2	3		13												1	1		1
Fall River, Mass.	69,500	30	22.4	13	43.3	3		3		9			3												4
New Haven, Conn.	125,000	44	18.8	25	56.8		1	3		16			1		1										1
Providence, R. I.																									16
Total	800,500	382	24.8	184	48.1	14	3	43		116	6	1	9		4	6	2	3			1	1			
EASTERN CITIES.																									
Albany, New York	103,000	47	23.7	22	46.8			4	1	7		1	15	16	5	34	1	26			7	6			4
New York, New York	1,355,000	756	29.0	376	49.7	27	3	92	5	192	0	6	15	16	5	34	1	26			7	6			9
Brooklyn, New York	670,000	307	23.8	164	53.4	10		38	2	90	9	2		4		11	2	7			1				5
Hudson County, New Jersey	225,000	91	21.0	47	51.6	2	1	5		16	2				2	1						4			1
Newark, New Jersey	154,000	78	26.3	35	44.8	3		10	1	17	3		1	1	1		1	1							7
Philadelphia, Pa.	940,000	383	21.2	169	44.1	16	10	40	3	60	7		16		6	9	4				1	1			7
Wilmington, Delaware	50,000	31	32.8	16	51.6	2		5	1	3			2			1									26
Total	3,497,000	1,693	25.2	820	48.9	60	14	194	13	385	30	9	34	21	14	57	8	34			9	11			
LAKE CITIES.																									
Buffalo, New York	105,000	46	22.8	23	50.0	2	3	6		16	1		1			2	1	3				2			5
Rochester, New York	105,000	46	22.8	23	50.0	2	3	6		16	1		1			2	1	3				2			5
Cleveland, Ohio	210,000	85	21.0	54	63.5	1		6	1	27	1					3		2							1
Detroit, Michigan	140,000	79	29.3	37	46.8		1	2	2	21	5		4	1		1		2			2				1
Chicago, Illinois	650,000	300	24.0	184	61.3	13	1	18	2	76	9		17	1	1	8	4	7	1	13	4				5
Milwaukee, Wisconsin																									
Total	1,105,000	510	24.0	298	58.4	16	5	32	5	140	16		22	2	1	14	5	14	1	15	7				5
RIVER CITIES.																									
Pittsburg, Pa.	210,000	78	19.3	48	61.5	6	1	3		17	6		3		2	3		1				2			3
Cincinnati, Ohio	275,600	113	21.3	48	42.4	7	1	11	1	19			6		2	4		1							1
Louisville, Ky.	137,000	59	22.4	18	30.5			8		3					2										
Indianapolis, Ind.	94,000	31	17.1	11	35.4			8	1	1			1	1											
Minneapolis, Minn.	100,000	47	24.4	34	72.3	1	1	5	1	14	3		3												
Evansville, Ind.	34,000	14	21.4	6	42.8			3		5			1												
St. Louis, Mo.	375,000	173	24.0	78	45.0	5	1	13	2	32	4	1	5	10	1	7		3			1	1			4
Total	1,225,600	515	21.8	243	47.1	19	4	51	5	91	13	1	21	12	7	15	2	5			2	3			4
SOUTHERN CITIES.																									
District of Columbia, Wh.	133,800	57	22.1	20	35.0	1		13		11		1	3			2									3
Richmond, Va., Wh.	60,300	47	35.3	31	85.9	8		4		8			1			1									
Charleston, S. C., Wh.	41,000	16	20.3	9	56.2			3		3															
Atlanta, Geo., Wh.	32,400	18	28.9	4	22.2	2		1		1															
Augusta, Geo., Wh.	25,000	11	22.9	3	27.2			1		1															
Savannah, Geo., Wh.	27,800	17	31.8	6	85.2	1		4		2	1														
Nashville, Tenn., Wh.	30,000	12	20.8	6	50.0			1		5															
New Orleans, La., Wh.	20,000	17	44.2	12	70.5			5		5															
Augusta, Geo., Col.	20,000	9	23.4	3	33.3			1		3															
Savannah, Geo., Col.	15,000	18	45.1	8	46.1	1		2		3					8	1									
Nashville, Tenn., Col.	35,100	19	28.2	7	36.8	1				5	2		1	1											
New Orleans, La., Col.	21,300	17	41.5	4	28.5	1		4		2	1		1	1											
Total White.	455,900	208	23.7	72	35.8	6		26		33	2	1	8	8	2	4		3			3	1			4
Total Colored.	248,800	166	34.7	74	48.8	10		25		22	2		7	9	1	4		1			1	1			1
Total in 31 U. S. Cities	7,332,800	3,474	24.6	1,700	48.9	125	26	371	23	787	60	12	101	52	29	99	17	60	1	27	26	1	55		
Summary of Mortality in 28 English Cities.																									
August 9.	8,762,354	3,670	21.9			133				585	22		45		70						92			22	75
" 9.	1,254,607	500	20.7			14				51	7		5		14						65			31	8
" 9.	858,660	345	20.9			2		57		15					8						47				
" 9.	139 German Cities.																								
" 9.	15 Swiss Cities.																								
" 9.	455,537	200	22.8			9		26		41	2	1	15								8			2	1

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C. Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied. The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending August 23, 1884, in 31 cities of the United States, having an aggregate population of 7,332,800, there died 3,474 persons, which is equivalent to an annual death-rate of 24.6 per 1,000, an increase of 1.6 over that of the previous week. The deaths under 5 years of age were 48.9 per cent. of the total mortality, the percentage being highest in the Lake cities—viz., 58.4 per cent. The rate in the North Atlantic cities was 24.8; in the Eastern cities, 25.2; in the Lake cities, 24.0; in the River cities, 21.8; and in the Southern cities, for the whites 23.7, and for the colored 34.7 per 1,000.

Accidents caused 3.6 per cent., consumption 10.6, diarrhoeal diseases 22.6, and typhoid fever 2.9. The highest percentage from diarrhoeal diseases was in the North Atlantic cities—viz., 30.3; the lowest among the colored in the Southern cities—viz., 13.2 per cent. The percentage of deaths from typhoid fever has been gradually increasing; it caused 4.3 per cent. of all deaths in the Lake cities, 4.0 per cent. in the River cities, and 4.2 in the Southern cities among the colored. Diphtheria caused 1.9, malarial fevers 1.4, scarlet fever 0.8, pneumonia 2.8, bronchitis 1.7, measles 0.7, and whooping-cough 1.5 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 30 new cases of typhoid fever, 21 of diphtheria, and 41 of scarlet fever.

DETROIT, MICH.—Dr. O. W. Wight reports 11 new cases of diphtheria and 9 of scarlet fever.

BALTIMORE, MD.—The weekly report of the Health Officer records 163 deaths, of which 70 were under 5 years of age. The annual death-rate for the whole population was 20.72 per 1,000, or 18.78 for the whites and 32.06 for the colored. Diphtheria caused 7 deaths, croup 2, scarlet fever 2, typhoid fever 6, malarial fevers 4, whooping-cough 5, diarrhoeal diseases 30, consumption 20, and violence 7.

MASSACHUSETTS.—During the week ending August 16, in 111 towns of the State, there were 195 deaths from the principal zymotic diseases. The death-rate was 19.6 per 1,000, against 20.4 for the preceding week. Diarrhoeal diseases caused 141 deaths, typhoid fever 14, whooping-cough 14, diphtheria 10, scarlet fever 5, and measles 1. The highest death-rates recorded were 28.9 in Holyoke and 27.6 in New Bedford.

NEWARK, N. J.—The report for the week ending August 16 came too late for tabulation. The number of deaths was 77, of which 39 were under 5 years of age. Accidents caused 1 death, consumption 11, croup 1, diarrhoeal diseases 18, diphtheria 3, and puerperal diseases 2.

ATLANTA, GA.—During the week ending August 16, there were 30 deaths, 9 white and 21 colored. The decedents under 5 years numbered 11. Accidents caused 1 death, consumption 2, diarrhoeal diseases 8, typhoid fever 1, malarial fever 1, and whooping-cough 1.

HUDSON COUNTY, N. J.—The number of deaths during the month of July was 483, equivalent to a death-rate of 27.7 per 1,000. The rate is 0.4 below the average of the corresponding month for the past 7 years. The decrease in the death-rate was due to the reduction in the infantile mortality, especially from cholera infantum. Accidents caused 27 deaths, consumption 49, croup 3, diphtheria 4, diarrhoeal diseases 106, typhoid fever 9, scarlet fever 9, small-pox 1, measles 3, and whooping-cough 2.

Rheims.—August 3-9: Deaths, 79; annual death-rate, 43.7 per 1,000. Whooping-cough caused 1 death, diphtheria 2, typhoid fever 2, consumption 7, diarrhoeal diseases 43, and violence 1.

Marseilles.—During the month of July, the number of deaths was 2,478, which is equivalent to the high rate of 82.6 per 1,000. Of the decedents 639 were under 5 years of age. To Asiatic cholera were attributed 1,215 deaths, or about one-half of all deaths. The total number of deaths from cholera, from June 27 to August 4, was 1,311, and the maximum of mortality was reached July 11, when there were 75 deaths. Typhoid fever caused 59 deaths, measles 24, whooping-cough 10, scarlet fever 6, small-pox 9, diphtheria 26, diarrhoeal diseases other than cholera 272, and violence 27.

Belgium—Brussels.—Week ending August 2: Deaths, 180; annual death-rate, 23.8 per 1,000. Small-pox caused 5 deaths, scarlet fever 2, typhoid fever 5, diphtheria 2, diarrhoea 44, consumption 10, and violence 2.

Russia—St. Petersburg.—July 20-26: Deaths, 510; annual death-rate, 28.6. Small-pox caused 2 deaths, measles 13, scarlet fever 4, typhoid fever 14, diphtheria 8, whooping-cough 6, diarrhoeal diseases 133, and acute lung diseases 51.

Denmark—Copenhagen.—Week ending August 5: Deaths, 113; annual death-rate, 22.0 per 1,000. Measles caused 3 deaths, diphtheria 2, whooping-cough 3, typhoid fever 3, diarrhoeal diseases 15, consumption 11, and violence 1.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	National Gas-Light Company.	Harlem Gas-Light Company.
Aug. 30.....	25.50	18.64	22.81	29.33	28.24	18.46

E. G. LOVE, Ph.D., Gas Examiner.

A WELSH workman recently attempted to relight an electric-lamp by means of matches.

THE Boston *Herald* has discovered three electric-light companies which are occupying the same building in peace and plenty (?)

THE citizens of Tonawanda, N. Y., held a meeting not long since to consider the question of constructing gas-works.

A GAS-WELL in the central part of the manufacturing district of Pittsburg is furnishing an abundant supply of gas at a pressure of eighteen pounds.

ADRIAN, MICH.—The Adrian Gas-Light Company has just received the contracts for the gas-fitting of the new court-house and new city-hall.

THE citizens of Crestline, O., are jubilant over the discovery of a gas-well, which, they say, will bring to their city several manufacturing industries. Gas was struck at a depth of 450 feet.

IT is becoming very common to light large steamships with the electric-light. The steamer "Mexico," recently completed by R. Napier & Son, is provided with 220 Swan incandescent-lamps.

IT is stated that natural-gas at 50 cents per 1,000 cubic feet is much more costly than coal, and that until it can be sold for from 10 to 15 cents per 1,000 cubic feet, the saving will not be great enough to hope for its general use.

THE London and Northwestern Railway Company has introduced a number of Lewis' incandescent gas-lights at its Euston Square station. Each light consumes twelve and a half cubic feet of gas per hour.

THE Common Council of Saginaw, Mich., recently voted to give the Vandepoelle Electric-Light Company \$25,000 for lighting the city for a year. The resolution was vetoed by the Mayor, and to settle the question the matter was left to the people to settle by a popular vote. Out of about 700 votes cast less than 100 were in favor of electric-lighting.

THE Orange, N. J., *Journal* suggests that the Common Council of the city should attempt to secure a reduction in the cost of lighting the public lamps. The city has just entered into a one-year contract with the Citizens' Gas Company, of Newark, at \$22 per lamp, and the reduction is urged because the city of Newark, with a two-years' contract on hand, secured a reduction from the company of \$2 per lamp per annum.

DETROIT, MICH.—The tower system of lighting as adopted by the Brush Electric-Light Company is a failure. The company talks of erecting additional towers, but it is doubtful if that will remedy the defect. The fact is the towers are too high and the light does not penetrate through the trees. Many portions of the city are in utter darkness, and already the people are clamoring for more light.

Notes.

CONSTRUCTION.

SCHENECTADY, N. Y.—The contract for constructing the city sewers was awarded to S. V. Trull, of Amsterdam, the amount being \$22,460.10.

THE city of Houghton, Mich., is about to issue bonds to the amount of \$25,000, with which to secure water-works.

BROOKLYN, N. Y.—The contract for the Brooklyn Young Men's Christian Association building has been sub-let by H. N. F. Marshall to the Flynt Building and Construction Co., of Palmer, Mass.

ADRIAN, MICH.—The architect of the new City Hall is Sidney Osgood, of Grand Rapids, and the builders Beck & Vogt, of Adrian. The cost of the building is \$14,000.

FRAMINGHAM, MASS.—The Framingham Water Company expects to be able to supply the town with water in a few months. A pump with a capacity of one million gallons daily is to be constructed, and also one of half that capacity.

WATERTOWN, MASS.—The Watertown Water-Supply Company is building works to supply this town with water, and bids are invited for supplying the pumping-apparatus.

LYNN, MASS.—The Water Board is considering the matter of raising the dam at Birch Pond. The estimated cost of the work is \$33,800. George H. Bishop is the engineer in charge.

THE following were the bids received and opened on August 28 for the construction of the Red Bank, N. J., Water-works: W. J. J. Smith, Spring Lake, N. J., bid \$53,000 as per specification; price \$300 per foot of well below 64 feet. Edward Freel, Brooklyn, N. Y., bid \$54,500; price \$150 per foot of well below 64 feet. John E. Holliday, Jersey City, N. J., bid \$43,400; price \$200 per foot of well below 64 feet. J. M. Low, Kingston, N. Y., bid \$39,900; price \$350 per foot of well below 64 feet. Southwark F'd'y & M. Co., Philadelphia, bid \$41,975; price \$40 per foot of well below 64 feet. Wm. Richardson & Wm. Farrier, Bound Brook, N. J., bid \$39,700; price \$275 per foot of well below 64 feet. E. T. Field, Red Bank, N. J., bid \$51,803.20; price \$158 per foot of well below 74 feet.

GOVERNMENT WORK.

THE contract for completing the superstructure of the new Post-Office building at Baltimore has been awarded to Gill & McMahon, whose bid was \$108,235, which is \$148 less than that of the present contractor, M. A. McGowan.

THE following is an abstract of the bids received for decorating and frescoing the Post-Office at Harrisburg, Pa.: Fr. Beck & Co., New York, \$10,000; E. S. Meragula & Co., St. Louis, \$7,350; John Gibson, Philadelphia, \$7,400.

THE following were the bids for a hydraulic-elevator for the building corner F and Seventeenth Streets, Washington: G. C. Howard, Philadelphia, \$5,250; Otis Bros. & Co., New York, \$6,450; Whittier Machine Co., Boston, \$5,465.

THE following is an abstract of the bids for stone and brick-work on the Post-Office, etc., at Jefferson City, Mo.: Smith, Sargent & Co., stone \$36,760, brick \$16,714; M. A. McGowan, stone \$49,700; J. H. Macnamara & Co., stone \$63,500, brick \$20,000; Buehrle & Trippensie, brick, sample No. 1, \$24,000, No. 2, \$19,500. The awards will be made next week.

THE following is a schedule of the bids received for dredging Mobile Harbor, Ala.: George C. Forbes & Co., Mobile, per cubic yard, 11½¢; James E. Slaughter and John H. Gardner, Mobile, 10½¢; Rittenhouse Moore, Mobile, 10¢; American Dredging Co., Philadelphia, 14¢; Tobias Burke, Mobile, 9¢; S. N. Kimball, Apalachicola, Fla., 12½¢; John A. Benson and J. H. McNee, San Francisco, 15¢. Contract awarded to Tobias Burke.

BIDS were opened on August 22 for the construction of a new annex building at the Soldiers' Home. The lowest bid was that of Robert Downing, of Washington, D. C., at \$63,902.

THE contract for the plumbing and gas-fitting of the Post-Office building at Jackson, Miss., has been awarded to H. B. Bruser, at his bid of \$1,060.30. He has also been given the contract for furnishing fittings at prices ranging from 7¼¢ to 12½¢ per pound.

THE contract for supplying brass-tubes to the Bureau of Equipment and Recruiting has not yet been awarded. The lowest bidder was the Bridgeport Brass Co., of Bridgeport, Conn.

THE following are the bids for dredging in Potomac River: 150,000 cubic yards in trench and embankment, section 3, Morris & Cummings Co., New York, 22¢ per cubic yard, total \$33,000; Atlantic Dredging Co., Brooklyn, 13½¢, total \$20,250; Ross & Sanford, Jersey City, 11¢, total \$16,500; D. Constantine, Baltimore, 12½¢, total \$18,450; Thomas P. Morgan, 15½¢, total \$23,100; Frank C. Somers, Philadelphia, 10½¢, total \$15,937.50. Contract awarded to F. C. Somers.

Washington Channel—D. E. Culver Co., \$208,125; Rittenhouse Moore, Mobile, \$154,683.50; Benson & McNee, San Francisco, \$123,700; Ross & Sanford, Jersey City, \$209,843.75; National Dredging Co., Wilmington, Del., \$236,250. The contract has been awarded to Benson & McNee.

GENERAL M. C. MEIGS, in charge of the construction of the new Pension building, received the following bids in answer to his advertisement of August 22, for laying terracotta pipe around the building. All bidders are Washington men: R. G. Campbell, per lin. foot, 85¢, total \$901; James A. O'Hare & Co., \$1, total \$1,060; James Horan, total \$975; J. A. Blunden, 89¢, total \$850; J. J. Desmond & Co., total \$731.40; Thomas J. Huyles, \$1.67. James F. Brien put in a bid to do the work for \$224.72, and found, when it was too late, that he had made a mistake. He put in another offer to do the work for \$724.72, which would have given him the contract had it not been too late to have it accepted as a bid. The contract has been given to J. J. Desmond & Co.

No proposals were received in response to advertisements for improvements on Big Sandy River. Captain Post, Corps of Engineers, in charge of the work, has been authorized to purchase the cement required in open market.

COURT-HOUSE AND POST-OFFICE, JEFFERSON CITY, MO.—Synopsis of bids for stone and brick-work of basement and superstructure. Advertisement of July 29, 1884; opened August 26, 1884:

Smith, Sargent & Co., stone-work, \$36,760; time to complete, September 1, 1885; Warrensburg stone; brick-work, \$16,714. M. A. McGowan, \$49,700; 18 months; Warrensburg or Bedford stone. J. A. Macnamara & Co., \$65,500; 16 months; Warrensburg or Bedford stone; \$20,000. Buehrle & Trippensie, brick-work, \$24,000, sample one; \$19,500, sample two. Joseph M. Marshall, brick-work, \$16,000.

THE following abstract of proposals for the extension of the Burlington breakwater have been received by the Chief of Engineers from Lieutenant-Colonel H. M. Roberts: David W. McConnell, Buffalo, N. Y., 235,000 feet b. m. hemlock, per M, \$23; 165,000 feet b. m. white pine, per M, \$34.50; 240 feet b. m. white oak, per M, \$50; stone, 9,000 cubic yards, per yard, \$1.50; 4,800 pounds screw-bolts, 3¼¢ per pound; 34,000 pounds drift-bolts, per pound, 3¼¢; 320 pounds wrought-iron spikes, per pound, 3¼¢; total, \$25,906.50. William Patrick, Phoenix, N. Y., hemlock, \$28; white pine, \$30; white oak, \$50; stone, \$1.28; screw-bolts, 4¢; drift-bolts, 3¢; spikes, 5¢; total, \$24,290. Luther Whitney, Keeseville, N. Y., hemlock, \$25; white pine, \$30; white oak, \$40; stone, 40¢; screw-bolts, 15¢; drift-bolts, 3¢; spikes, 6¢; total, \$20,813.80. Contract awarded to Luther Whitney.

THE following is a synopsis of the bids received for dredging 40,000 cubic yards, more or less, of mud, clay, sand, etc., from natural channel, through Sandusky Bay, O., and through the "out-bar" to deepen the same: George Talbott, New York, per cubic yard, 24¢; George W. Sheldon, Toledo, 22¢; L. P. & J. A. Smith, Cleveland, 21¢; William E. Rooney, Toledo, 18¢; John Stang and Quarters Gillmore, Lorain, O., 17½¢; Edwin French, Fulton, N. Y., 25¢. Contract awarded to Stang and Gillmore.

ABSTRACT of proposals for furnishing stone for Cape Fear River, N. C., opened at Baltimore, August 28, 1884. Lieut.-Colonel Wm. P. Craighill, engineer in charge: Rose & Lara, Wilmington, N. C., delivered at wharf, \$1.48 per ton, small; G. Z. French, Rocky Point, N. C., delivered at Wilmington, \$1.55 per ton, heavy, delivered at Government Works, \$1.75 per ton, heavy, delivered at Wilmington, \$1.48 per ton, small, delivered at Government Works, \$1.68 per ton, small, delivered at Government Works in 7 feet of water, \$1.70 per ton, as it runs in quarry; C. H. Edwards, Boston, Mass., delivered at Smithville, \$3.90 per ton, heavy; Bodwell Granite Co., Rockland, Me., delivered at Wilmington, \$2.33 per ton, small, \$2.10 per ton, heavy; S. Perkins, Boston, Mass., delivered at Wilmington, \$2.37 per ton, small, \$2.33 per ton, heavy; Davis Tillson, Rockland, Me., delivered at Smithville, \$2.15 per ton, small, \$1.95, heavy; F. H. Smith, New York, N. Y., delivered at Smithville, \$2.94 per ton, heavy; A. L. Lockwood, New York, N. Y., delivered at Smithville, \$1.99½ per ton, small, \$2.03½, heavy; W. F. Haigh, New York, N. Y., delivered at Smithville, \$2.35 per ton, heavy; Cumming & Brown, New York, N. Y., delivered at Wilmington, \$3.19 per ton, small, \$3.05 per ton, heavy; C. A. Brown, New York, N. Y., delivered at Smithville, \$1.95 per ton for all; J. S. Howell, New York, N. Y., delivered at Smithville, \$2.32 for all; H. P. Gilbert, Georgetown, D. C., delivered at Smithville, \$2.77 per ton, small, \$2.97 per ton, heavy.

ABSTRACT of proposals received and opened by Major Mackenzie, Corps of Engineers, U. S. A., Rock Island, Ill., August 23, 1884, for dredging in the harbor at Rock Island: Dredging and depositing material at a distance not to exceed 1 mile, 20,000 yards—B. E. Linehan, Dubuque, Ia., per yard 22 cents, \$4,400; A. J. Whitney, Keokuk, Ia., 11½¢, \$2,300; H. S. Brown, Quincy, Ill., 25¢, \$5,000; C. S. Whitney, Keokuk, Ia., 23¢, \$4,600. For use of dredge and plant per hour, 200 hours—B. E. Linehan, \$9.50, \$1,900; A. J. Whitney, Keokuk, Ia., \$10, \$2,000; H. S. Brown, Quincy, Ill., \$12, \$2,400; C. S. Whitney, Keokuk, Ia., \$8, \$1,600.

ABSTRACT of proposals for dredging Cape Fear River, N. C., opened at Baltimore, August 28, 1884. Lieutenant-Colonel Wm. P. Craighill, engineer in charge: Penson & McNee, San Francisco, Cal., measured in situ, per cubic yard 18½¢; Sandford & Rose, Jersey City, N. J., measured in scows, 14¢, \$14 per hour for dredge when removing stumps; Rittenhouse Moore, Mobile, Ala., measured in scows, 14½¢; Geo. C. Forbes & Co., Baltimore, Md., measured in scows, 14½¢, \$160 per day for removing stumps; Morris & Cummings Dredging Co., New York, N. Y., measured in scows, 14½¢, \$15 per hour for stumps; National Dredging Co., Wilmington, measured in scows, 12½¢. Lilliput Shoal, 14½¢. Big Island and Log Shoal, 23¢. Brunswick Shoal, \$18 per hour for removing stumps; Thos. P. Morgan, Washington, D. C., measured in scows, 13½¢. Lilliput Shoal, 24¢. Big Island and Log Shoal, 18¢. Brunswick Shoal, 17½¢. for all; New York Steam Dredging Co., New York, N. Y., measured in scows, 12½¢, \$14 per hour for removing stumps.

THE following is a schedule of the bids for furnishing cast-iron water-pipes and special castings to the District of Columbia: A. H. McNeal, who was awarded the contract for 70 per cent. of pipe and special castings, bid in detail as follows: 132,812 tons of 12-inch pipe, \$4,462.48; 196,875 tons of 10-inch pipe, \$18,647.14; 10 tons special casting, \$616. The Camden Iron-Works bid \$30,375.20, and the Gloucester Iron-Works, \$30,740.82 for the same articles. F. C. Viney, who made no deposit, bid on 30 6-inch two-way water-gates and boxes. His bid was \$2,250. John McClelland, who was awarded the contract for all the articles bid on by him, bid as follows: 50 fire-plugs, \$3,500; 30 6-inch two-way water-gates and boxes, \$1,380; 30 6-inch four-way water-gates and boxes, \$2,180; 3 10-inch two-way water-gates and boxes, \$210; 2 12-inch two-way water-gates and boxes, \$160.

SCHOOL-HOUSE FOR DISTRICT OF COLUMBIA.—Synopsis of bids for a new 12-room school-house on S Street, between Fourteenth and Fifteenth, Washington, D. C.:

Robert Downing, \$48,754.70; C. Thomas, \$44,225; Bright & McDermott, \$52,735; John Moore, \$47,000; George W. Corbut, \$51,900; J. D. Phillips, \$53,900; J. H. Howlett, \$46,500; R. W. Darby, \$55,500; G. Baldwin, \$43,789.99; Bright & Humphrey, \$48,730.

THE contract for dredging the channels leading to Baltimore Harbor has been awarded to the American Dredging Co., of Philadelphia.

Association News.

NEW YORK MASTER PLUMBERS.—The regular weekly meeting of the New York Association of Master Plumbers was held on the evening of August 29. Mr. James Muir tendered his resignation as a member and afterward withdrew it. In addition to the usual routine business there was some incidental discussion of the differences between the plumbers and the dealers.

THE ASSOCIATION OF MANUFACTURERS OF AND DEALERS IN PLUMBING MATERIALS OF NEW YORK AND BROOKLYN has issued the following: "New York, August 27, 1884. Dear Sir—Since returning our answer to Chairman of National Master Plumbers' Association, we find that nearly all our customers, whether belonging to the association or not, have no idea, or if any, an imperfect one, of the nature of the document presented or the demands made upon us; consequently we deem it only fair to the trade and just to ourselves that they should be in possession of a copy of both documents. We also take occasion to say that, in our business intercourse and conversation, we find, with hardly an exception, our customers and the trade generally are most decidedly opposed to, and disclaim any indorsement of, the action of said association, or of the principles embodied in its demands. Furthermore, we are pleased to note a very general and widespread satisfaction with the existing relations between the trade and ourselves, and a well-established confidence that all upright and honorable dealers will at all times protect and consider the interests of the trade. Signed for the manufacturers, John D. Fraser, Chairman; S. F. Sniffen, Secretary."

BOOKS RECEIVED.

ARMY MEDICAL DEPARTMENT REPORT. For the year 1882. Vol. XXIV. London, 1884.

ELEVENTH ANNUAL REPORT OF THE BOARD OF WATER COMMISSIONERS OF THE CITY OF YONKERS, N. Y. For the fiscal year ending November 30, 1883.

PUBLIC HEALTH LAWS OF ILLINOIS AND SANITARY MEMORANDA. For the use and information of health officers and others. Illinois State Board of Health, 1884.

SIXTH ANNUAL REPORT OF THE BOARD OF WATER COMMISSIONERS OF THE VILLAGE OF JOHNSTOWN, N. Y. For the fiscal year ending April 30, 1884.

SANITARY ARRANGEMENTS OF DWELLING-HOUSES. Notes in connection with the Sanitary Exhibits at the International Health Exhibition. By Mark H. Judge, A. R. I. B. A. London, 1884.

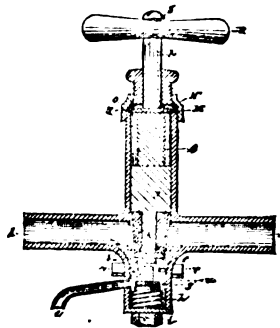
SECOND ANNUAL REPORT OF THE CENTRAL COUNCIL OF THE CHARITY ORGANIZATION SOCIETY OF THE CITY OF NEW YORK. Read at the annual meeting, May 13, 1884.

THIRTY-EIGHTH ANNUAL REPORT OF THE COMMISSIONERS IN LUNACY TO THE LORD CHANCELLOR. London.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

296,797. WASTE-COCK. HENRY TAYLOR and RICHARD B. SHARP, Cleveland, Ohio. Filed April 26, 1882. Renewed December 21, 1883. (No model.) Issued April 15, 1884.

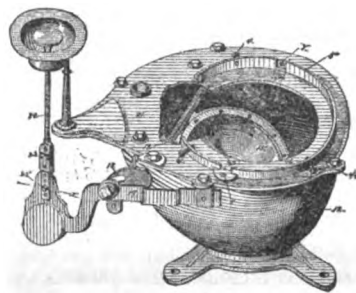


Claim.—In a waste-cock the combination of the handle R, plunger J, and rubber plug J, with washer G, and spring H, operating in the manner and for the purposes set forth and described.

296,822. WATER-CLOSET. PATRICK CONNOLLY, Brooklyn, N. Y. Filed May 23, 1883. (No model.) Issued April 15, 1884.

Claim.—In a water-closet, the combination, with the chamber or box provided with side recesses in its

top opening and removable plates for closing said recesses, of the removable pan, substantially as described. 2. The combination, with the basin provided with a flange, as 7, of the body or chamber provided with a flange, as 5, and set-screws, as 4, passing through said flange 5 and abutting against said flange 7, substantially as described.



3. The combination, with the lever 19, of the rod 20, having a universal joint, as 23, substantially as described.

4. The combination, with the lever 19, provided with the ribs 2, of the nut 24, bolt 25, and pull-rod 20, substantially as described.

296,788. DUST-ARRESTER. OSWALD KUTSCHKE, Grand Rapids, Mich. Filed January 29, 1884. (No model.) Issued April 15, 1884.

296,788. STEAM-BOILER AND FURNACE LINING. CHARLES McMILLAN, Chicago, Ill. Filed December 8, 1879. Renewed March 16, 1882. Again renewed March 11, 1884. (Model.) Issued April 15, 1884.

296,789. FIRE-ESCAPE SLING. BENEDICK MILLER and GEORGE H. HUME, Paola, Kansas. Filed June 22, 1883. (No model.) Issued April 15, 1884.

296,791. SMOKE-CONSUMING DEVICE. JOHN W. SMITH and JAMES D. SMITH, Washington, D. C., assignors of fourteen twenty-fourths to Simpson P. Moses, William B. Moore, and I. Heylin McDonald, all of same place. Filed September 22, 1883. (No model.) Issued April 15, 1884.

296,839. STEAM-ALARM AND DAMPER-REGULATOR. JOHN C. JONES and CHARLES T. REID, Decatur, Ill. Filed November 30, 1883. (No model.) Issued April 15, 1884.

296,874. ELECTRIC FIRE-ALARM APPARATUS. MAJOR DANIEL PORTER, Boston, Mass. Filed December 11, 1883. (No model.) Issued April 15, 1884.

296,877. WRENCH. BARNEY ROSS, Sterling, Ohio. Filed December 26, 1883. (No model.) Issued April 15, 1884.

296,920. FIRE-ESCAPE LADDER. WILLIAM BRANNAN, Fredericksburg, Va. Filed July 23, 1883. (No model.) Issued April 15, 1884.

296,924. SELF-FEEDING RATCHET-DRILL. ROBERT N. CHERRY, Jersey City, N. J. Filed November 15, 1883. (No model.) Issued April 15, 1884.

296,926. HOT-AIR FURNACE. PERRY B. CLARK, Minneapolis, Minn. Filed September 25, 1883. (No model.) Issued April 15, 1884.

296,942. WRENCH. JAMES DU SHANE, South Bend, Ind. Filed November 30, 1883. (No model.) Issued April 15, 1884.

296,972. WATER-FILTER. EMILE KARST, St. Louis, Mo. Filed November 2, 1883. (No model.) Issued April 15, 1884.

296,990. EARTH-REMOVER. SAMUEL A. MILLER, Philadelphia, Pa. Filed August 29, 1883. (No model.) Issued April 15, 1884.

297,001. WOODEN PUMP. DAVID PLEWS, Toronto, Ontario, Canada. Filed March 17, 1881. (No model.) Patented in Canada January 15, 1881. Issued April 15, 1884.

297,009. STEAM-BOILER. JACOB ROBERTS, Brooklyn, N. Y. Filed July 16, 1883. (No model.) Issued April 15, 1884.

297,063. VALVE-GRINDER. HARRY W. BURLING, Franklin, N. H. Filed December 11, 1883. (No model.) Issued April 15, 1884.

297,076. PUMP. ROBERT HARDIE, Hoboken, N. J., assignor of one-half to John A. Walsh, New York, N. Y. Filed April 16, 1883. (No model.) Issued April 15, 1884.

297,089. FIRE-ESCAPE. REUBEN C. RUTHERFORD, Quincy, Ill., assignor of one-third to James Woodruff, same place. Filed August 16, 1883. (No model.) Issued April 15, 1884.

297,092. ROTARY WATER-METER. FREDERICK STITZEL, Louisville, Ky., assignor of one-half to Adolph Reutlinger, same place. Filed July 24, 1883. (Model.) Issued April 15, 1884.

297,113. GAS-GOVERNOR. JOHN S. CONNELLY, Pittsburg, Pa. Filed November 3, 1883. (No model.) Issued April 22, 1884.

297,119. BED-PAN. JULIA E. DRAKELEY, Madison, Wis. Filed November 3, 1883. (No model.) Issued April 22, 1884.

297,120. VAPOR-STOVE. FAY O. FARWELL, Cresco, Ia., assignor of one-half to George C. Bents, same place. Filed August 15, 1883. (No model.) Issued April 22, 1884.

297,122. SMOKE-CONSUMER. WILLIAM J. FITCH, Chicago, Ill. Filed July 19, 1883. (No model.) Issued April 22, 1884.

297,126. PORTABLE FIRE-ESCAPE. FRANCIS INGERSOLL FREEMAN, Warren, O. Filed February 7, 1884. (No model.) Issued April 22, 1884.

297,171. RATCHET-DRILL. CASPAR SCHUMACHER, Kalk, Germany. Filed December 21, 1882. (No model.) Patented in Germany July 21, 1881, No. 17,477. Issued April 22, 1884.

297,189. MEANS OF VENTILATION. MARSHALL B. STAFFORD, New York, N. Y. Filed May 3, 1883. (No model.) Issued April 22, 1884.

297,209. WRENCH. THOMAS FOSTER WHITE, Salem, Kan. Filed September 8, 1883. (No model.) Issued April 22, 1884.

297,210. RATCHET-DRILL. PARDON A. WHITNEY, Cleveland, O. Filed June 22, 1883. (No model.) Issued April 22, 1884.

297,223. DUST-ARRESTING MACHINE. JOHN S. BRANDSTÄETER, Liverpool, county of Lancaster, Eng. and. Filed March 21, 1883. (No model.) Patented in England November 17, 1882, No. 2,367, and in France November 18, 1882, No. 152,780. Issued April 22, 1884.

297,264. PIPE-COUPLING. THEODORE HUNT, St. Louis, Mo. Filed November 6, 1883. (No model.) Issued April 22, 1884.

297,301. WATER-METER. NICHOLAS SEIBERT, Maplewood, assignor of three-eighths to Oliver E. Simmons, Boston, and Edward W. Simmons, Jamaica Plain, Mass. Filed July 11, 1883. (No model.) Issued April 22, 1884.

297,325. STEAM-RADIATOR. CORYDON WHEAT, Geneva, N. Y. Filed March 8, 1883. (No model.) Issued April 22, 1884.

297,329. GAS-ENGINE. S. LLOYD WIEGAND, Philadelphia, Pa. Filed September 18, 1883. (No model.) Issued April 22, 1884.

297,340. GRATE. LEMUEL BANNISTER, Philadelphia, Pa. Filed April 28, 1883. (No model.) Issued April 22, 1884.

297,360. VISE ATTACHMENT. CHARLES H. EDDY, Auburn, N. Y., assignor to himself and Gustave S. Baker, same place. Filed March 4, 1884. (No model.) Issued April 22, 1884.

297,363 and 297,364. FILTERING APPARATUS. JOHN F. C. FARQUHAR and WALTER OLDHAM, London, England, said Oldham assignor to said Farquhar. Filed November 4, 1882. (No model.) Issued April 22, 1884. Patented in France September 13, 1879, No. 132,711; in Belgium September 15, 1879, No. 49,316; in Germany September 30, 1879, No. 9,557; in Spain March 30, 1881, No. 1,279; in Italy May 10, 1881, No. 12,933; in Portugal June 1, 1881, No. 678; in Sweden July 22, 1881, No. 210; in Norway August 2, 1881; in Denmark October 12, 1881; in Austria October 13, 1881, No. 1,407, and in England August 25, 1882, No. 4,072.

297,374. ROOFING COMPOUND. JAMES T. FRETWELL, Atlanta, Geo. Filed November 13, 1883. (No specimens.) Issued April 22, 1884.

Claim.—A roofing compound composed of Roman cement, sand, white-lead, litharge, and linseed-oil, all mixed together in about the proportions and in the manner specified.

297,376. PUMP. ROBERT P. GARSED, Norristown, Pa. Filed September 26, 1883. (No model.) Issued April 22, 1884.

297,400. DOUBLE-ACTING PUMP. WILLIAM H. HOLCOMBE and CLIFFORD A. HOLCOMBE, Beloit, Wis., assignors to the Holcombe Brothers and Stone Manufacturing Corporation (Limited), same place. Filed January 22, 1883. (No model.) Issued April 22, 1884.

297,434. HEATING AND VENTILATING APPARATUS. PATRICK W. NOLAN, New York, N. Y., assignor to himself and Carlos Bardwell, Lakewood, N. J. Filed March 17, 1883. (No model.) Issued April 22, 1884.

297,436. DUST-COLLECTOR. BARNIM F. ORTMAN and HORATIO R. TAYLOR, Buffalo, N. Y. Filed January 23, 1884. (No model.) Issued April 22, 1884.

297,441. PRESSURE-REGULATING VALVE. GALEN W. PEARSONS, Kansas City, Mo. Filed October 25, 1883. (No model.) Issued April 22, 1884.

297,444. APPARATUS FOR THE MANUFACTURE OF GAS. HENRY M. PIERSON, Brooklyn, N. Y. Filed November 5, 1883. (No model.) Issued April 22, 1884.

297,447. HOSE-PIPE NOZZLE. JOHN E. PRENTY, Baltimore, Md. Filed December 7, 1883. (No model.) Issued April 22, 1884.

297,449. FIRE-PROOF BUILDING. GUSTAVUS W. KADER, New York, N. Y. Filed January 18, 1884. (No model.) Issued April 22, 1884.

297,478. ROTARY PUMP. ALBIN WARTH, Stapleton, N. Y. Filed July 26, 1883. (No model.) Issued April 22, 1884.

297,483. OIL-CUP FEEDER. JAMES E. WORSWICK, Montgomery, Ala., assignor of one-half to Arthur T. Hannon, same place. Filed January 31, 1884. (No model.) Issued April 22, 1884.

297,504. TRAP FOR STEAM-PRESSURE GAUGES. GEORGE HANNIBAL CROSBY, Somerville, Mass. Filed December 3, 1883. (No model.) Issued April 22, 1884.

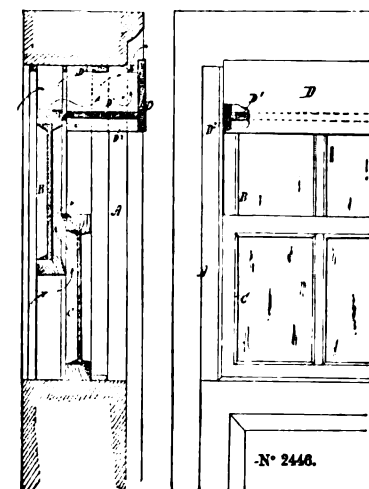
297,507. STEAM-EMPTYING ASH-PAN. JOHN DESMOND, Jackson, Mich., assignor to James Carey and Charles Rutson, both of same place. Filed February 16, 1884. (No model.) Issued April 22, 1884.

297,548. FIRE-GRATE. GEORGES ALEXIS-GODDARD, Paris, France. Filed January 15, 1884. (No model.) Issued April 22, 1884.

297,567. LUBRICATOR. MILTON S. CABELL, Quincy, Ill. Filed February 16, 1884. (No model.) Issued April 22, 1884.

English Patents.

2,446. IMPROVEMENTS IN WINDOW-VENTILATORS, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:



This invention consists in a ventilator of certain novel construction, which is designed to be applied to the upper part of a window for the purpose of deflecting or throwing upward the incoming current of fresh air produced when the upper sash is lowered, at the same time permitting the escape of foul air, the latter, as is well known, having a tendency to rise and seek an outlet. JONATHAN BADGER, of No. 161 West 29th Street, New York, State of New York, one of the United States of America.

Com. spec. January 31, 1884. (Price 4d.)

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; b s dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

124 Forsyth st, 5-story br ten and st, 25 x 81; cost, \$16,000; o, Barbara Fuhrbach; a, Wm. Graul.
(6) Water st, 5-story br ten, 25x68; cost, \$14,000; o, Henry Bornkamp; a, James Barrett.
102 Bleecker st, 6-story br warehouse, 22.11x19.10, cost, \$65,000; o, Moritz H. Rosenstein; a, Alfred Zucker; b, not selected.
147-149 55th st, n s, 125 e 7th av, 3-story br and stone stable, 50x94; cost, \$16,000; o, A. H. Barney; a, C. H. Thompson; b, J. C. Miller.
10th av, s w cor 48th st, 4-story br store and ten, 25.1x96; cost, \$20,000; o, Mrs. C. Miller; a, A. Pfund & Son.

BROOKLYN.

Monroe st, s s, 24.6 w Throop av, 12 3-story and bmt b s dwells, 19.1x42; cost ea, \$6,000; o and b, John F. Ryan; a, John Herr.
Monroe st, s w cor Throop av, 4-story b s st and ten, 24.6x55; o, a and b, same as last.
Atlantic av, n e cor Bedford av, 195 on Atlantic av, rear, 120 irreg x 241.7, 2-story and 3-story tower br skating rink; cost, \$25,000; o, Leland Tuttle & Co.; a, A. B. Ogden & Son.

Pineapple st, s s, 80 w Fulton st, 4-story br apart house, 51x64; cost, \$25,000; o, Gordon L. Ford; a, Carl F. Eisenach; b, Donlon & Walton and Morris & Selover.

ADRIAN, MICH.—Architect C. F. Matthes has prepared plans for a brick school-house to cost \$9,000.

BOSTON, MASS.—Danforth st, nr Boylston st, fr dwell; o, D. McDonald.
420 Meridian st, fr dwell; o, W. S. Jackson; a, S. Underwood; b, D. McPherson.

Lexington, cor Prescott st, fr dwell; o, Mrs. F. E. Dimmick; b, J. C. Frawn.

46-48-50 Woodbine st, 3 fr dwells; o and b, N. P. Ryder; a, S. D. Kelly.

64-66 Saratoga st, 2 fr dwells; o, S. C. Power.

592-596 E 4th st, 3 fr dwells; o, a and b, Lyman Locke.

217-219 Trenton st, 2 fr dwells; o, I. Killough; b, Frame & Patten.

8 Willard pl, br dwell; o, J. Feldman; a, S. Weisbein.

BROOKFIELD, MASS.—Granite passenger station; cost, \$6,500; o, B. & A. R. R.; a, E. C. Gordon; b, Flynt B. & C. Co.

CHICAGO, ILL.—Sebor and Desplaines, br flats; cost, \$40,000; o, E. Morton; a, Fred. Keltowe; c, George W. Brown & Co.

261-63 Ashland av, br dwell; cost, \$12,000; o, M. Hirsch.

Washington boul and Leavitt st, br dwell; cost, \$15,000; o, Alex. Moody; a, H. R. Wilson.

Groveland av, nr 20th st, br addn to hospital; cost, \$10,000; o, Heinemann; a, Wheelock & Clay.

161-63 W 20th st, br st and flats; cost, \$10,000; o, M. Desterich; a, E. C. Rehl; b, B. Cullen.

368-70 N. Water st, br addn to factory; cost, \$20,000; o, G. S. Kirk & Co.; a, Edbrooke & Burnham.

CINCINNATI, O.—Cor Kemper Lane and Curtis st, addn to church; cost, \$7,000; o, Church of Advent; b, McKay & Wells.

S side 5th st, bet Smith and John sts, 5-story br bldg; cost, \$10,000; o, S. Kuhn; b, C. F. Liff.

S w cor James and 5th sts, repairs to 2-story br bldg; cost, \$6,000; o, J. F. Schroth; b, H. Layman.

W side Cook st, bet Straight and Addison sts, 2 1/2-story br bldg; cost, \$7,000; o and b, David Hummel.

S e cor Findlay st and Western av, 3-story br bldg; cost, \$6,000; o, John Holscher; b, Miller & Rohner.

44 McMicken av, br bldg; cost, \$6,000; b, Schmitt & Bro.

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DEALING WITH FOREIGN RAGS:

THE order of the United States Treasury Department prohibiting the landing of foreign rags for three months, has been modified so as to permit the landing of rags shipped before the order was issued, when not from cholera-infected districts. This concession has been made in response to requests of the leading paper manufacturers of the country, who have taken the ground that if foreign rags cannot be obtained, a large industry will be embarrassed, and paper will increase in price. So far as it appears, their arguments are that having handled rags many years, and having no outbreaks in their mills, there is therefore no danger of importing cholera by means of rags.

This negative argument amounts to nothing, and is practically the same as assuming that if one goes unharmed through several battles, flying bullets are not dangerous. However small the risk may be, it is at least a small risk of a very great calamity. The first duty of the Government is to protect the health of its citizens, but its action should be intelligent, and as little restriction should be placed on commerce as is compatible with public safety.

The present action of the Government is, after all, only temporary in its effect and influence. The risks of introducing cholera next year will be as great, if not greater, than they are now. Rags to be shipped or now afloat, if infected, will be dangerous whenever landed, and nothing short of proper treatment of every bale of foreign rags will afford reasonable protection. With a view, therefore, of providing for the future disinfection of foreign rags, so that the public may be protected and the paper trade saved from embarrassment, we would suggest that the paper-makers induce the Government to exercise its right to request the National Academy of Sciences to appoint a committee to make an investigation, and report as to the best means of dealing with imported rags, in order that they may be landed at all times.

During the coming winter, then, with an intelligent proposition, Congress may be induced to enact a law which will make provision for the erection, at some suitable place, of a plant that will effectually deal, either by heat or chemicals, with all matter likely to convey infection. It seems to us that the influence of the paper trade can in this way be exerted for the good of the public as well as of themselves, and, at the same time, the hazards of their business be diminished.

TRANSPORTING PATIENTS WITH CONTAGIOUS DISEASES TO THE HOSPITAL IN PARIS.

In the *Bulletin de Statistique Municipale*, attention is called to the fact that an excellently-organized system exists in Paris, by means of which persons suffering from any contagious disease may be readily and rapidly conveyed to the proper hospital for treatment.

It appears that all that is necessary to insure direct removal (free of charge), between the hours of 8 A. M. and 6 P. M., is a mere request to that effect, which request can be made at any police-station. From there the call is telegraphed to the central station, and the ambulance responds.

These wagons are, of course, specially constructed for the use of the sick, are carefully

disinfected, and heated. A parent or friend may accompany the patient.

By making use of one of these conveyances the great danger of communicating the disease to others, who may employ the cabs so often used for the transporting of patients, is avoided, and the large fee usually demanded by drivers on such occasions is saved.

THE PLUMBERS' AND DEALERS' TRADE-PROTECTION CORRESPONDENCE.

WE elsewhere print some correspondence which has passed between the manufacturers of plumbing materials of this city and Mr. Andrew Young, as President of the National Association of Master Plumbers.

From a perusal of this, from letters received from plumbers throughout the country, and from the comments of the press, it seems that somehow or other the National Association of Master Plumbers has been placed in a false position before the community, and this apparently by the action of a committee of the New York and Brooklyn associations, countenanced by Mr. Young.

Mr. Young's hasty and ill-tempered letter was most unfortunate for him, since it has made it appear that the National Association proposes to indorse the idiotic demands of the New York committee.

We have been at considerable pains to inquire into this matter, with a view of presenting our plumbing readers with some explanation of the apparently ridiculous position the craft has been placed in. So far as now appears, New York dealers were invited to confer with Mr. Young, President of the National society. At this conference those claiming to act for the plumbers, with the exception of Mr. Young, were all from New York and vicinity. It is claimed that Mr. Young read from a newspaper slip the following resolutions, which it appears were adopted at the Baltimore meeting of the National Association:

Whereas, The manufacturing and wholesale firms in plumbing materials persist in selling to consumers, to our injury and detriment, placing us toward our customers in the light of extortionists, causing endless trouble; and

Whereas, The system of protecting us from this wrong, which draws in its wake other wrongs, is ineffective; it is absolutely necessary to perfect such a system, by united action, which will remove these evils from which we have suffered for years; therefore be it

Resolved, That any firm manufacturing plumbing materials selling to others than master plumbers, we withdraw our patronage from such firm.

Resolved, That the manufacturers of gas-fixtures selling to consumers shall not receive the patronage of any master plumber.

Resolved, That the master plumbers shall demand of the manufacturers and wholesale dealers in plumbing materials to sell goods to none but master plumbers.

Resolved, That this association keep a record of all journeymen and plumbers who place in buildings plumbing materials bought by consumers of manufacturers or dealers.

Resolved, That any manufacturing or wholesale dealers dealing in wrought-iron pipe who sell to consumers shall not receive our patronage.

Resolved, That a committee be appointed by this association in every State and county, for the purpose of reporting to the proper officer at its head in the State any violation of these resolutions.

Resolved, That these measures are just and necessary to our welfare, and a rigid enforcement is demanded.

Resolved, That this convention indorse the above, and urge upon the National Association to perfect and adopt a uniform system of protection for the trade over their entire jurisdiction.

Then the local members of the committee submitted their demands, which we printed on page 291, issue of August 28, and which we again print below. This the dealers rejected in their letter addressed to Mr. Young.

It now seems from Mr. Young's letter that he assumed that the dealers' reply had reference to the newspaper slip on which no action was taken, and was, after all, merely an expression of opinion, whereas the reply was to the distinct demands made by the local committee. If the dealers have made any mistake at all it has been in addressing their letter to Mr. Young, instead of to the New York committee; but they claim that he presided at the meeting, and they supposed that he, in behalf of the National Association, indorsed and proposed to force upon the manufacturers the impracticable demands of the New Yorkers.

However this may be, it is most unfortunate that Mr. Young should have lost his head and sent the foolish and intemperate letter that we print, since this letter has incited some hot-headed and unreasoning men to attempt the boycotting of firms who signed the manufacturers' letter, thus at once putting manufacturers on the defensive, with the result of bringing the whole wretched business before the public, and again subjecting plumbers to ridicule.

So far as the above resolutions are concerned, we do not by any means wish to be understood as indorsing them, beyond recognizing the principle that wholesale firms should not sell to the customers of their plumbing patrons at the same price as they sell to the plumber. And on this question our views are fully given on pages 409, 412, and 415, issue of April 5, 1883.

Plumbers as business men no doubt have their grievances—promises have been made to them and broken; they have also been untrue to each other—but we shall elsewhere endeavor to point out the futility of attempting to deal with the problem by combinations, associations, or agreements.

We have frequently had occasion to commend Mr. Young's conduct as President of the Chicago society, and we much regret this unfortunate controversy, which could have been avoided if he had been less hasty, and not allowed himself to be influenced by some very unreasoning and impracticable men, who no more fairly represent the views of the intelligent and successful men in this section than they do elsewhere.

Now as to the demands of the New York committee, which the dealers very properly rejected. These demands and the intemperate appeals in Mr. Young's unfortunate letter imply that the men in the plumbing business in the United States are in a wretchedly bad way; that unless water can be made to run up hill, and the laws of trade reversed, they cannot succeed in the battle of life. This is simply a libel on the successful, self-respecting men in the plumbing business. Such men, however strong their feelings of loyalty to their associations may be, will be forced, in order to retain the respect and confidence of their profitable patrons, to either prevent a repetition of such absurd actions, or sever their connection with their associations. We reproduce the following as a specimen of the worst species of impracticable trade-unionism that the brain of man could conceive:

Propositions presented to the Associations of New York and Brooklyn, and adopted unanimously:

1st. *That the manufacturers and dealers in materials shall not sell to others than licensed plumbers, who shall exhibit a certificate duly signed by the president and secretary of their respective association. This certificate guarantees that such plumber is entitled to all privileges and be renewed every three months.*

2d. *That no manufacturer or dealer shall figure on plans or specifications for any person, whether engaged in the plumbing business or not.*

3d. *That no plumber, manufacturer or dealer in patented articles shall sell to others than licensed plumbers as stipulated in Article 1.*

4th. *That any plumber who waives his discount in favor of his customer shall be dealt with as one not entitled to the regular trade discounts, and his certificate shall be revoked*

and remain so until he be properly reinstated and receive a new certificate from his association.

5th. *That manufacturers and dealers shall not furnish repairs, or do the same, except through a regularly licensed plumber.*

6th. *That manufacturers and dealers shall not become sureties for the fulfillment of any plumbing contract.*

7th. *That where manufacturers and dealers require security from plumbers, such security shall not be accepted from any interested party, whether owner or contractor.*

8th. *Agents of manufacturers and dealers shall be prohibited from selling plumbing goods to any person other than those stipulated in Article 1.*

9th. *That the manufacturers and dealers pledge themselves not to sell or deal with any person or persons other than those stipulated in Article 1. [Issue of August 28.]*

We ask the indulgence of our readers for an apparent insult to their intelligence, in assuming to point out the obvious absurdity of the demands made by this New York committee, since we are informed that there are some sincere and well-meaning men in the trade who are yet unable to appreciate their impracticability.

In the first place, how can a committee of any association guarantee manufacturers who have goods to sell that these goods will be bought and paid for?

In what way can the association as an association guarantee a definite amount of trade? Where is the financial responsibility of committees?

Are not too often the most noisy and impracticable men at association meetings those who have little business and less credit?

How is any association going to secure for such men profitable patrons?

Have the owners of property no voice in the matter as to when work is to be done, how much shall be done, and what the character of the materials employed shall be?

If a man is too busy attending to the wants of his customers to be able to attend plumbers' meetings, and finds that the men who do attend do things that he cannot indorse or commend, is he bound to become or remain a member of an association, and take his share of responsibility for matters he can neither control or prevent?

Is such a man, if he elects to remain outside the association, no matter how much the public desire his services, to quit the plumbing business?

Is a man of self-respect and capacity likely to be bulldozed in any such manner, and is he likely to be more successful if he conducts his business in accordance with the absurd views of men who have not, as a rule, been successful in their own affairs?

Does any sane man believe that a firm of ordinary intelligence which will accede to such propositions as the dealers rejected, has any honest desire or expectation of ever living up to it?

Agreements of the character proposed are ropes of sand, made to be broken, and to permit the tricky and unscrupulous to profit by the incredulity of their more honest but short-sighted competitors.

No! The whole thing is utterly absurd and impracticable, and the quicker the question of "trade protection" as an association problem is dropped the better it will be for the plumbing trade and the plumbers' associations. We predict that any rash attempt to boycott any firm or firms which have been honest enough to refuse to accede to demands that are obviously impossible to comply with will result to the great advantage of the firms thus assailed and the permanent injury of the men engaged in the attempt.

Moreover, plumbers may rest assured that the public will soon cease employing men whose inclinations and conduct indicate their peculiar fitness for the character of "walking delegates" or agitators. People who want profitable work done are not apt to employ such men as these; and capable men who attend to their business can find customers who will let them make a reasonable profit, and manufacturers who will accord their patrons all reasonable protection. This requires no society intervention, for society agreements never make tricky men honest.

As to the conduct of manufacturers in dealing with demands of the character under discussion, they will, in our opinion, make a mistake if they hold any more conferences, write any more letters, or in any way attempt to recognize this as an association matter. A firm that expects to be honest, pay a hundred cents on the dollar, and avoid being taken advantage of by those who are unscrupulous, must act alone and for themselves. They best know the character of their business, the kind of customers they prefer, and what promises they can afford to keep. Their understandings should be with their customers, and whatever they do agree to do, they should abide by. Buncombe promises and conduct are not the tactics of men whose word can be relied on, and plumbers, like other men, should not forget it.

IMPROVEMENTS IN THE HULL GENERAL INFIRMARY.

IN our notice of the alterations in the Hull General Infirmary on page 266, issue of August 21, the name of the architect was inadvertently omitted. It was Mr. H. Saxon Snell, F. R. I. B. A., 22 South Hampton Buildings, London.

THE Summer Corps of fifty physicians appointed by the New York Board of Health finished its work for the season on August 30. The comparative number of deaths for the months of July and August in the last four years is as follows:

	1881.	1882.	1883.	1884.
July.....	4,296	4,434	4,108	3,926
August.....	3,407	3,329	2,914	3,146
Total ..	7,703	7,813	7,022	7,072

THE AMERICAN INSTITUTE FAIR.

ARRANGEMENTS for the Fifty-third Annual Exhibition of the American Institute have already been commenced by the Board of Managers. It will be opened on the 24th day of September at its buildings, Third Avenue and Sixty-fourth Street, New York.

Judging from the information at hand the coming exhibition will be more than usually attractive. A large number of applications for space have been received this year, up to date, than has previously been the case, and among these are promised many novelties in the various departments into which the exhibits are divided. These divisions are seven in number, and are "Fine Arts and Education; The Dwelling; Dress and Handicraft; Chemistry and Mineralogy; Machinery; Inter-communication; and Agriculture and Horticulture." These departments, it may be mentioned, are subdivided into seven groups each, each group having three judges who examine all the articles on exhibition and make a report thereon to the Board of Managers, recommending such awards as they may adjudge due, and upon these reports the managers act.

Manufacturers, designers, inventors, and others desirous of placing their products before the public at the coming fair, should, without delay, send their applications for space to Mr. Charles Wager Hull, the General Superintendent, at the office of the Institute, 22 Cooper Union, New York.

The entrance fee to exhibitors is \$10, but no charge is made for space. The entrance fee also gives the exhibitor the right of admission to the building for himself and employees.

THE Liverpool Society for the Prevention of Cruelty to Children, formed about a year and a-half ago on the model of the New York Society, reports that in six months it has been obliged to deal with 50 cases of violent assaults, 106 cases of cruel neglect, 210 cases of begging and vagrancy, and 12 cases of immorality in which children have been distressingly affected. The report attracted so much attention in England that the Lord Mayor of London asked the chairman of the society to a conference, which led to the formation of a similar society in London the 18th instant.

MR. RUDOLPH HERING, of Philadelphia, has been engaged to design plans for the sewerage of the city of Trenton, N. J.

DUBLIN.—Public baths are being built in Dublin, at a cost of \$25,000.

OUR BRITISH CORRESPONDENCE.

Pollution of the Lower Thames—Proposition for Purification from the German Ocean—National Hungarian Exhibition at Buda-Pesth—Pollution of the River Wey—Failure of Electric-Lighting at South Kensington—Experimental Light-Houses—Improved Ambulance-Van—Sanitary Condition of Calcutta—Health of the British Army—A Candidate for Medical Experiments.

LONDON, August 30, 1884.

THE Local Government Board will shortly issue a report, prepared by its engineer, on the pollution of the lower Thames by the sewage of the metropolis. I understand the report condemns the present system of discharging crude sewage into the Thames at Barking Creek. A correspondent has recently in one of the daily papers made a suggestion for the purification of the Thames. His scheme is that pure water should be brought up through conduits from the German Ocean at flood tide, and allowed to accumulate in a large reservoir at a convenient point near one of the higher reaches of the river. At low water the contents of the reservoir could be discharged into the river, and the increased velocity thus obtained would greatly assist—so he affirms—in scouring the bed of the river, and would send the sewage-polluted water further out to sea. While not entering into the question of the feasibility of this scheme, it is certainly the fact that something must shortly be done, for there is hardly any water in the river a few miles up from London at low tide, and the dredging operations of the Thames Conservancy seem rather to make matters worse than improve them.

A general national exhibition has been organized by the Hungarian Government, and will be opened next May at Buda-Pesth. In addition to exhibits of a national character, there will also be international exhibits, such as engines and tools suitable for the small trades; agricultural seeds, cattle food, also important patented inventions and improvements. The general commission of the exhibition is under the direction of M. Matkovits, Chief Secretary of the Minister of Agriculture, with Count A. Zichy as vice-president. The building and grounds, which will be erected in a suitable manner, will cover an area of 270,000 square metres.

The river Wey, a tributary of the Thames running from Weybridge down to Guildford, has by the latter town become much polluted lately, owing to the refuse from some manufactory on its banks being allowed to flow into the river. The water has become like black ink, with a white froth floating on the surface, and the fish have literally perished by the ton. The local authorities are naturally greatly indignant, but not being sure of their power to stop the nuisance, have petitioned the Local Government Board, asking that authority to remedy the existing dangerous state of things.

The scheme for the electric-lighting of the principal streets of South Kensington has failed, the Board of Trade having given notice that they have revoked the South Kensington electric-lighting order of 1883. The inhabitants of the district much regret this revocation, and it seems surprising with the successful installation of the electric-light in their midst—viz., at the Health Exhibition—that the local authorities should not have been more energetic to secure the new light for the streets of this important district.

The Trinity House authorities, with a party of scientific gentlemen from Canada, are now engaged in making a series of observations in connection with the experimental light-houses at the South Foreland, and the full extent of the penetrating power of the lights are being fully tested.

Dr. Gayton, the Senior Medical Officer of the Metropolitan Asylum Board, has constructed an improved ambulance-van. Instead of the open glass and wooden louver shutters as hitherto used, the apertures in Dr. Gayton's safety-ambulance consist of a double layer of perforated metal inclosing a sufficient layer of suitable absorbent material saturated with an acknowledged germicide. "Tobin" ventilators, improved and modified, admit fresh air; these ventilators are of a horn-shape, with the larger end open externally, while inside the van the smaller extremity of this air-tube is provided with a disinfecting-chamber.

The Lieutenant-Governor of Bengal has decided to appoint an official commission to inquire into the sanitary condition of Calcutta, and to report whether the conservancy of the town is defective. The municipality disapprove of the action of the Lieutenant-Governor, considering it as an unmerited censure on their sanitary administration.

The annual report for 1882 on the health of the British army has just been issued. The total number of white troops serving at home and abroad was 174,557. There were admitted into the hospitals during that period 10.93 per thousand; the deaths were 12.06 per thousand; the discharges by invaliding 19.45 per thousand, and the non-effective through sickness 54.21 per thousand. With the exception of the discharges by invaliding the figures show a decrease from the preceding year's report.

According to the Warsaw *Courier*, an enterprising young man offers himself for medical experiments. He states he is unmarried, has no ties of any kind, has made no plans for the future, and seeks no reward, only stipulating his fare should be paid from Warsaw and back again supposing he survives the experiments. He adds he is twenty-four years of age and quite healthy.

SAFETY-VALVE.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(From an Occasional Correspondent.)

PHILADELPHIA, PA., September 6, 1884.

"THERE'S another society!" cried a young *gamin*, as a red-badged company poured out from the Vine Street ferry-house this evening, and scattered to the several hotels and boarding-houses at which the members of the American Association are being entertained. Another society, truly enough, for this week the City of Brotherly Love is the place of meeting also of the American Institute of Mining Engineers, of the Electrical Engineers, and of some other associations, besides being the stopping-place of many who are visiting the Electrical Exhibition.

This year it is Philadelphia whose citizens are asking, "What is this scientific society?" The American Association for the Advancement of Science, which now embraces in its membership nearly all in this country who are actively engaged in scientific pursuits, meets annually, now in this city and now in that, not so much for the presentation of abstruse scientific papers as for the social coming together of those interested in kindred pursuits. Professional men, scattered throughout our large country during the greater part of the year, are brought together for a few days in social intercourse and informal discussion; the younger men learn to know those to whom they have looked up and revered; the citizens who entertain learn something of what science is. The meeting of the present year is of unusual interest on account of the presence of some two hundred visitors from across the ocean who have been attending the meeting of the British association at Montreal. In spite of the intensely warm weather, which makes even still life a burden, there has been registered up to Saturday evening 1,050 attendants upon the meeting, and 400 new members of the association have been already elected. The sessions of the various sections have been interesting and largely attended, and the Academy of Music was packed on Friday evening to listen to the address of the retiring president, Professor C. A. Young, of Princeton, N. J., in spite of the stifling atmosphere.

Among the officers of the association for the present year we notice many names well-known to scientists, such as those of J. P. Lesley (President), John Trowbridge, of Cambridge, R. H. Thurston, of Hoboken, E. D. Cope, of Philadelphia, E. S. Nurse, of Salem, John Eaton, Commissioner of Education, etc.

The term "sanitary science" is not recognized in the nomenclature of the association. There are, in fact, very few papers on subjects which come within the direct scope of THE SANITARY ENGINEER, but in the list of arrivals are the names of many with whom your readers are more or less familiar on account of their interest in sanitary matters. Among them are John H. Rauch, M. D., Chicago; Lewis H. Steiner, M. D., Frederick City, Md.; Ezra M. Hunt, M. D., Trenton, N. J.; George M. Sternberg, U. S. A.; J. T. Fanning, Manchester, N. H.; Prof. William Ripley Nichols, Boston; Prof. A. R. Leeds, Hoboken, N. J.; Prof. A. B. Prescott, Ann Arbor, Mich.; Rudolph Hering, Philadelphia; A. H. Allen, Sheffield, England.

On Friday, Mr. Clifford Richardson, of the Agricultural Department, read an interesting paper on the chemistry of roller-milling, giving the results of analysis of samples of all the various products obtained in the milling of hard Western spring wheat. Prof. Atwater's paper on the "Chemistry of Fish" deserved a larger and more general audience. Mr. J. C. Hoadley, of Boston, read a paper on "Driven-Wells," embodying the results of a very extensive and thorough series of experiments on the principle and action of the driven-well. No abstract could do justice to this paper, which, I

understand, will be published *in extenso*, with illustrative diagrams, in some engineering periodical. Dr. George M. Sternberg, U. S. A., well-known for his work on the bacteria, described the various methods of cultivating micro-organisms. Other papers already entered bearing upon sanitary subjects are: Method for the Practical Examination of Railway Employees as to Color-Blindness, Acuteness of Vision and Hearing, with the results obtained by it on the Pennsylvania Railroad, by William Thomson; Percentages and Costs of Nutrients in Foods, by W. O. Atwater.

It will appear from this meagre list that the visiting sanitarian will find comparatively little of professional interest. He will, however, if a member of the association, find much of interest in a general way, provided he can endure a tropical temperature.

THE BRITISH SCIENCE ASSOCIATION.

THE opening exercises of the British Association for the Advancement of Science on Wednesday evening, August 27, described in our last issue, were followed on Thursday and Friday by the reading of papers on subjects connected with electricity, as follows:

1. Special discussion on the Seat of the Electromotive Forces in the Voltaic Cell—Opened by Prof. O. J. Lodge.
2. Report of the Committee on Electrical Standards.
3. Sir William Thomson—On Safety Fuses for Electric Circuits.
4. Lord Rayleigh—a lecture—Experiment on Induction.
5. Lord Rayleigh—On Telephoning through a Cable.
6. Lord Rayleigh—On a Galvanometer with Twenty Wires.
7. Professor Schuster—On the Influence of Magnetism on the Discharge of Electricity through Gases.
8. Professor Fitzgerald—On an Analogy between Heat and Electricity.
9. Mr. W. H. Preece—On the Law Regulating the Connection between Current and Intensity of Incandescence of Carbon Filaments in Glow-Lamps.
10. Professor Sir William Thomson—The Equations of Dynamo-Electric Machines.
11. Mr. E. O. Walker—On Earth-Currents.
12. Dr. Stone—On Electro-Dynamometer with extremely light-moving Coil, intended for the Measurement of Small Attenuating Currents.

The association adjourned from Friday evening till Monday, in order to afford members the opportunity of making trips to Quebec, Ottawa, Lake Memphremagog, Chambly Fort, and other places worth visiting.

Monday's Programme.

SECTION A—MATHEMATICS AND PHYSICS.

Discussion "on the Connection of Sun Spots with Terrestrial Phenomena"—Opened by Prof. A. Schuster.

Report of the Committee on Harmonic Analysis of Tidal Observations.—On Solar Radiation.—On Tidal Observations in the English Channel.

Earl of Rosse—Electrical Control of Equatorial Driving-Clock.—On the Polishing of Specula.

Prof. Johnson—On the Importance of Tidal Observations in the Gulf of St. Lawrence and the adjacent Atlantic Coast.

C. Carpmael—On a new Form of Inductive Inclino-meter.

Dr. H. Muirhead—On the Formation of a Mackerel Sky.

Prof. James Thomson—On Whirlwind and Water-Spout.

Rev. S. J. Perry—Connection between Solar and Terrestrial Phenomena.

Prof. H. A. Rowland—Recent Progress in Photographing the Spectroscope.

Rev. S. J. Perry—On the Spot Spectrum, from D to B.

Prof. E. J. Douglas Archibald—Some Preliminary Experiments with Anemometers attached to Kite Wires. The recent Sun Glows and Halo in Connection with the Eruption of Krakatoa.

Prof. Balfour Stewart and Lant Carpenter—On Certain Short Periods common to Solar and Terrestrial Phenomena.

George H. Henshaw—On the Formation of Frazil Ice.

H. S. Poole—Notes on the Internal Temperature of the Earth at Woodville, N. S.

SECTION C.—GEOLOGY.

Reports and Papers read on Monday in this section:

Prof. T. R. Jones—Second Report on the Fossil Phyllo-poda of the Palaeozoic Rocks.

W. Topley—Report upon the National Geological Surveys of Europe.

Prof. J. T. Blake—First Impressions of some Pre-Cambrian Rocks of Canada.

Prof. James Hall, State Geologist, New York—On the Fossil Reticulate Sponges constituting the Family *Dictyospongiidae*. On the Lamellibranchiate Fauna of the Upper Helderberg, Hamilton, Portage, Chemung, and Catskill groups (equivalent to the Lower, Middle, and Upper Devonian of Europe); with especial reference to the arrangement of the Monomyaria, and the development and distribution of the species of the genus *Leptodesma*.

T. Sterry Hunt, LL.D., F. R. S.—The Eozic Rocks of North America.

Prof. T. R. Jones, F. R. S.—On the Geology of South Africa.

H. J. Johnston-Lavis, F. G. S.—Notice of a Geological Map of Monte Somma and Vesuvius.

SECTION E.—GEOGRAPHY.

1. James Glaisher, F. R. S.—Report of the Committee for Promoting the Survey of Western Palestine.

2. J. Beaufort Hurlbert, M. A., LL.D.—Comparison of the Climates of the Eastern and Western Hemispheres.

3. J. Beaufort Hurlbert, M. A., LL.D.—Some Peculiar Storms of the North American Continent.

4. G. T. Fletcher—The Crown Land Surveys of the Province of Quebec.

5. Trelawney Saunders—Dominion Surveys.

6. James Dillon, C. E.—An Automatic Sounder.

7. Memorandum on the proposed British Commercial Geographical Society.

SECTION H.—ANTHROPOLOGY.

The section met at 11 o'clock on Monday, when papers were read in the following order:

1. Mrs. Ermine A. Smith—Remarks on the Customs and Language of the Iroquois.

2. F. H. Cushing—On the Development of Industrial and Ornamental Art among the Zunis of New Mexico.

3. Dr. Daniel Wilson—The Huron Iroquois, a Typical Race of the American Aborigines.

4. C. A. Hirschfelder—Anthropological Discoveries in Canada.

5. James Dallas—On the Primary Divisions and Geographical Distributions of Mankind.

6. Miss A. W. Buckland—Facts Suggestive of Pre-historic Interchange between East and West.

7. Hyde Clarke—Observations on the Mexican Zodiac and Astrology.

The only meeting held in the evening was at Queen's Hall, where the Rev. W. H. Dallinger delivered a lecture on the Modern Microscope in Researches on the Least and Largest Forms of Life.

The practical work of the British Association was concluded on Tuesday (September 2). The dinner given in honor of Lieutenant Greely and his associates was a hearty demonstration of English sympathy and good-will. Great interest was shown in their achievements in the interest of science, and a strong impulse was given by their presence to the cause of Arctic exploration. The sections were busily at work all the afternoon, and the arrears of business were effectually cleared away. The Mathematical and Physical section had a long programme of twenty-six papers, and was divided into two sub-sections. One of these took up questions of pure mathematics and astronomy, and the other problems in physics. In the Chemical section there was a shorter programme, including only seven headings. The Biology section had an array of twenty-three papers and was forced to sub-divide into two assemblies, one dealing with the general department and the other with special questions of physiology.

Specially noteworthy among the papers read during the last sessions of the association were those by Sir William Dawson "On the More Ancient Land Floras of the Old and New Worlds;" by Emile de Laveleye, the distinguished Belgian political economist, on "Land Laws;" by Professor Thomson, on "Dynamo Electric-Machines;" by Professor G. Forbes, on "Heating of Conductors by Electric Currents;" by Lieut. Ray, U. S. A., on "Habits and Customs of the Inuits of the Western Shores and Point Barrow;" by Miss Maria Rye, Mrs. Burt, and the Hon. Mrs. Joyce, on "Female Emigration;" and by Prof. E. Hull, on "The Geology of Palestine" (read by Sir William Dawson).

In the evening there was a public reception in the skating-rink, attended by nearly all the visitors and a large portion of their local entertainers.

The closing meeting of the association was held on Wednesday, September 3, at Queen's Hall. The Council

and Section Presidents were on the platform. Lord Rayleigh returned thanks for the splendid hospitality which had been extended, and pronounced the meeting a success from all points of view. He then declared the association finally adjourned.

PLUMBERS' AND DEALERS' TRADE-PROTECTION CORRESPONDENCE.

THE following correspondence has followed that which we published on page 291, issue of August 28:

To the Vice-Presidents of the States and Presidents of Local Associations.

GENTLEMEN: Having been made aware of the fact that the rights of the trade were being ignored by the manufacturers of New York and vicinity, and being desirous of presenting for their consideration and acceptance the protection resolutions unanimously adopted by the national body at Baltimore, a meeting was called of the Manufacturers and Dealers at the United States Hotel, in New York, on Thursday, August 14, 1884. On taking the chair, I informed the gentlemen present that our organizations in the West were working under and in compliance with the Baltimore resolutions; that our relations with our manufacturers and dealers were all that could be desired, and I earnestly urged upon them the acceptance of the same. Upon motion, the Baltimore resolutions were read to the meeting. At the conclusion of the reading, a committee representing the New York and Brooklyn associations asked for the privilege of reading some resolutions of a local character, which was granted. I, at the same time, called the attention of the meeting to the fact that all matters relating to protection must be based on, and in conformity with, the resolutions of the National Association. Pending action on the local resolutions, I called Vice-President J. A. Macdonald, of New York, to the chair, who conducted the meeting to its close. Upon motion, the resolutions were referred to the manufacturers, and the meeting adjourned until Thursday, August 21, giving them reasonable time for consultation and action. On Thursday, the 21st, the following remarkable answer was made to the wisdom that framed your resolutions, and to the intelligence that unanimously adopted them at your national meeting. [Here follows the reply of the Manufacturers and Dealers, as published in the issue of August 28.]

The first part of their reply is a deliberate insult to the men comprising your late convention, inasmuch as it flatly states that the Baltimore resolutions could not be the thoughtful and deliberate action of that body.

Again, they state in their reply that they regret the position in which they are placed, as they are most desirous of furthering the interests of the plumbing trade. Philanthropists, every one of them! When and where have the Eastern manufacturers made a concession in the interests of our trade, save on an enforced demand? or point out a concession voluntarily made? They have made agreements only to break them, and I have the undeniable and unimpeachable proof of their bad faith in the handwriting of some of the honorable (?) gentlemen, whose signatures are attached to the reply. But after their fulsome regrets that they should differ from us in this matter, *we come to the only honest expression contained in their reply.* They say, furthermore, we must embrace this opportunity of stating most distinctly that we find no just cause for any special protection other than that which the usual laws of commerce accord alike to all. This is the answer from men whose wealth and prosperity are the result of combinations—men who are the pirates of your mechanical skill—men who have enriched and made what they are. This is our answer. *Ponder on it; act on it, like men.* There is not an article in your demands worthy of their consideration. "The right of petition is granted to every man in this broad world of ours, except to you," say the autocrats of our trade. I commend to them for their guidance the last two lines of their reply.

And now, one word with some of the manufacturers who signed that reply. Why were the Protection Resolutions of the National Association kept in the background and not brought before your meeting? Mr. Fraser, of Abendroth Brothers, one of your committee, states that they were not brought up for your consideration. And why? Because the artful dodger, who framed your reply, knew that if they were brought before you for consideration, you would not have fallen into the trap so skillfully prepared by him. You can now understand why the local resolutions were given prominence to the exclusion of the real business of the conference. It is right that our trade should know that manufacturers and dealers were threatened with boycotting by the leading manufacturers, unless they affixed their signatures to the reply as presented to me.

In conclusion, I need not tell the men of our trade what action they will, or should, take in this matter. *Your duty is plain, as is mine,* to protest, by every honorable means in our power, against these men who would deprive us of the name we bear as Master Plumbers.

I take pleasure in recommending to your patronage the manufacturers of the West and in your own vicinity, Renton Brothers, 105 East Ninth Street, New York City; William McShane & Co., 1344 Broadway, New York City; H. McShane, 52 Myrtle Avenue, Brooklyn, New York; H. McShane, Baltimore, Md., and H. McShane, Washington, D. C.

A list of Manufacturers and Dealers in the United States who are in sympathy with us will be forwarded to the State vice-presidents at an early day.

Respectfully yours, A. YOUNG,
President Nat'l Ass'n of Master Plumbers of the U. S.

NEW YORK, September 3, 1884.

To the Architects of the United States.

GENTLEMEN: We present the demands of the Master Plumbers' Association for trade protection, and our reply to the same; also, copy of a letter without date, but evidently written by Mr. Young since his return to Chicago. We place these documents before you with the following remarks: Firstly, their demands, as characterized in our answer, are so unbusinesslike and impracticable, and, we may add, so outrageous, that we feel justified in calling your attention specially in this manner, in order that you may fully understand the situation. We think it is due to you and to ourselves, as well as to the more intelligent and conservative members of the craft, that such an apparent effort to combine for the purpose of extorting from the public more than fair and reasonable prices for materials used in the business should be thoroughly comprehended; also, that the few who indorse the sentiments expressed in their demands should not be allowed to injure the reputation of the many leading and responsible master plumbers, who, we feel well assured, do not hold the opinions or indorse the business principles as laid down in these demands. Still, in view of Mr. Young's later epistle, and considering its communistic and vindictive tone, it may be well to remind you that some of the less thoughtful and more impulsive men may not use, or in some way may misrepresent our goods when specified by you; hence, we ask that you kindly guard our interests, and lend us your influence to stamp out a spirit of trades-unionism in one of its worst phases—a spirit not only opposed to all well-established business laws, but one that is directly antagonistic to the freedom of our laws and the spirit of our institutions. We ask this in view of the stand we have been compelled to take, which is, in our opinion, the only one that could be taken by upright and honorable business men.

Signed for the manufacturers,

J. D. FRASER, Chairman.

S. F. SNIFFEN, Secretary.

P. S.—If convenient, we should be pleased to have a reply. Address same to S. F. SNIFFEN, Secretary,
48 Cliff Street, N. Y.

BOSTON VIEW OF THE PLUMBERS' AND DEALERS' CONTROVERSY.

(From an Occasional Correspondent.)

THERE is a general expression of dissatisfaction among the members of the Boston Association, relative to the action taken by the Western members of the National Association. Boston plumbers have always wished for an amicable arrangement between the dealers and plumbers, for the mutual protection of both; and it was hoped the influence of the association might aid in securing such a result, but they most seriously object to this dictatorial, unreasonable, and hasty demand made by this committee. An action of this character will tend to destroy the good already done by the association, and create a feeling of distrust among the Eastern members. They already feel as if the West was endeavoring to carry out plans after their own idea, regardless of the wishes or interests of the East. The National Association was doing well, and gradually accomplishing the work it was organized for. The better class and most intelligent plumbers of Boston are unanimous in saying that the action taken by this committee is decidedly unbusinesslike, and does not voice the wishes of the trade at large. Furthermore, there are many good men who are not yet members of the association; also, there are many who have failed to take an active interest up to the present time, and an affair of this character calls forth severe criticism from those who are not members, and creates a feeling of disgust among the inactive ones. Therefore, any action of this character, in place of helping to hold up the interests of trade and build up the association, will tend to destroy the good already done, and retard future progress.

[We believe intelligent plumbers, West as well as East, hold similar views.—ED. SANITARY ENGINEER.]

HENRY L. DALTON.

At a meeting of the dealers of plumbers' supplies doing business in New England, consisting of Messrs. Stults & Mansuer, Phillips & Weeden, Ward & Curley, George Woodward & Co., and G. H. Tillinghast & Co., the following resolutions were unanimously adopted:

Whereas, It has pleased the Almighty God to take from our midst our esteemed and trusted friend, Mr. Henry L. Dalton; therefore, be it

Resolved, That our association has lost an honorable competitor, an upright business man, and a president whom all loved and respected.

Resolved, That our sincerest sympathy be tendered to his family in this their hour of sorrow, in the loss of their noble husband and father.

Resolved, That a copy of these resolutions be forwarded to the family of the deceased.

J. W. N. STULTS, Chairman.

G. C. PHILLIPS, Secretary.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XVI.

(Continued from page 316.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

EAST CENTRAL GALLERY B.

THE Glenfield Company, limited, Kilmarnock, Scotland, stand No. 445, exhibits an assortment of brass and iron-work for use in connection with water-supply. We select the following:

Hill's automatic flushing-apparatus shown in the illustration, Fig. 1, is intended for the flushing of sewers. It may be set in a receiving-basin or cistern of any dimensions into which roof or yard water can run, or the basin may be supplied from any other source. It is made to start the flush at a given head of water within the basin, and will remain open as long as there is sufficient water to fill the iron case *a*. *A* is the tank or basin which holds the water; *a* is the outer casing of the flusher, and *b* is a hollow inner casing forming a float-valve. When the head of water in *A* is sufficient to overcome the weight of the "float-valve" (*b*) when it is not supported with water, it (the valve) is lifted from the seat by the pressure underneath it, after which the escaping water while in the outer casing will float it and hold it open until the basin is nearly empty.

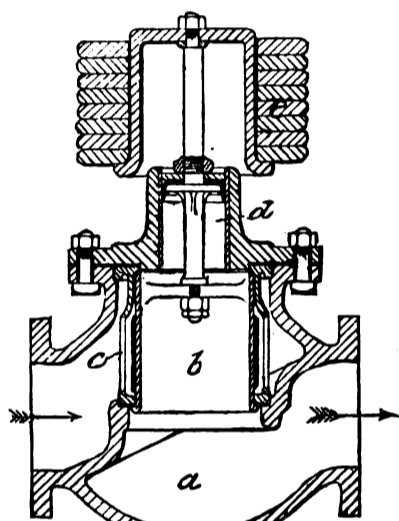


FIG. 2.

Key's patent reducing-valve (No. 3,173), Fig. 2, with pressure-gauges on the inlet and outlet ends, is shown at work. They are made for water-pipes from one and a half inches to eight inches in diameter, and, we are informed, are in use at West Hartlepool, Edinburgh, Folkstone, and other places. It consists of a tubular-valve, *b*, working in the cage *c*. To a spider in the centre of the valve is attached the stem *d*, on which there is a leather-packed piston, working in a cylinder open to the atmosphere. Above this on the same stem is an annular cap surrounded by cheeseweights, *e*. The action is as follows: Pressure enters at the left; there being no pressure in the valve or pipe at the right, the valve *b* is down and consequently opened. As soon as the pressure at the right or outlet end reaches the desired pressure, its action on the piston forces it upward, reducing the opening and shutting off the water. From this point the valve falls slightly again, allowing more water to pass, establishing an equilibrium and keeping a nearly constant and reduced pressure in the outlet end of the valve. Variations of terminal pressure are secured by more or less cheeseweights being placed on the cap. Figure 3 is a pressure-recording gauge for steam or water, by which reference to the dial will show the variations of pressure for the preceding hours. The diagram paper is metallized and is traced by a brass-wire pencil, which leaves a well-defined mark. A spiral spring behind the pencil, which is carried on parallel-motion bars, keeps the pencil to the paper and takes up the wear.

The principle of the recording arrangement is the action of the pressure on an India rubber diaphragm backed by a volute spring communicating the motion caused by the variations of the pressure to the parallel motion carrying the pencil. The recorder has its drum revolving once in twenty-four hours by clock mechanism, and consequently the paper must be changed once a day. There is a recorder of

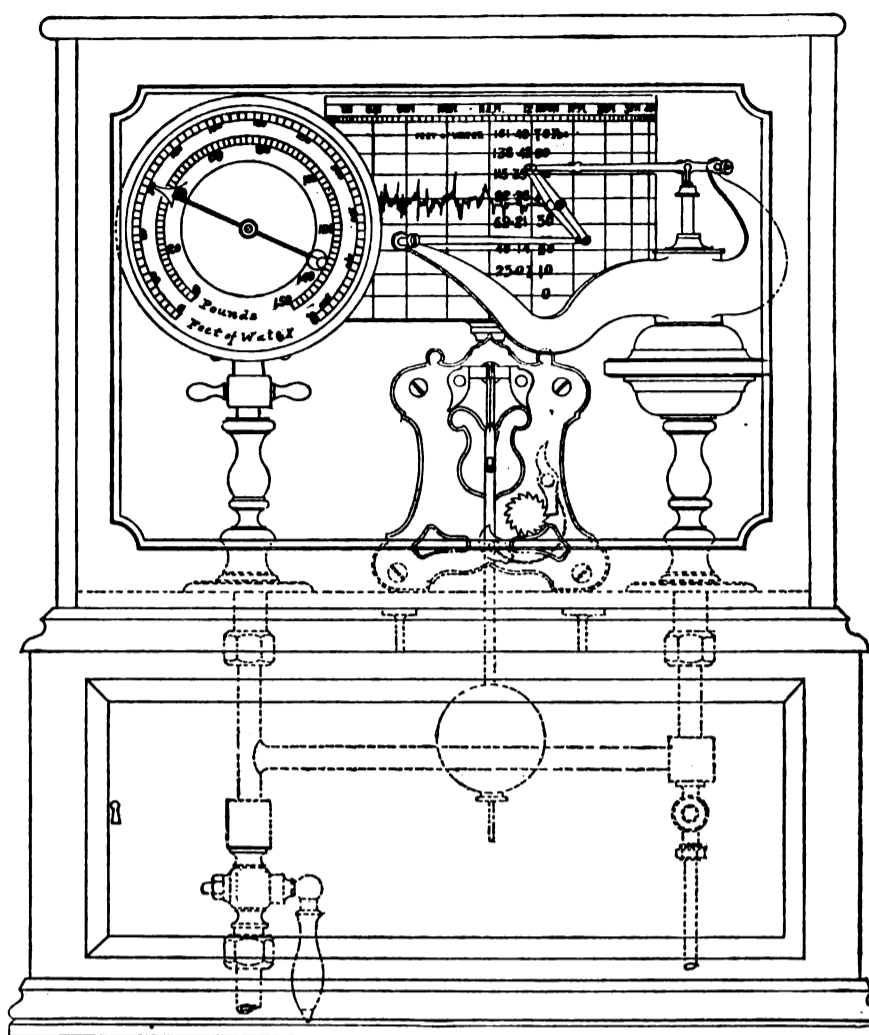


FIGURE 3.

this make in the exhibit of the East London Water Co., which takes a week's diagram without having to change the recording paper.

EAST CENTRAL GALLERY B.

This gallery contains a large collection of filters exhibited by a number of firms, and as each exhibitor claims that his filter is the only one which is efficient and safe, a person who was looking for a filter with a view to purchase would find it very difficult to come to a decision. Although

22 New Oxford Street, London, W. C., exhibits various forms of filters, involving the use of spongy-iron; also models (not very satisfactory, it must be confessed) to illustrate the use of this material on the large scale at Antwerp. The works at Antwerp have been already described in THE SANITARY ENGINEER. (See Vol. VI., page 421.)

No. 418. The Silicated Carbon Filter Co., Battersea, exhibits filters for various purposes, making use of blocks of the so-called silicated carbon, which is the residue ob-

tained by distilling a bituminous shale; carbon, in fact, mixed with mineral matter.

No. 422. P. A. Maignen, 22 and 23 Great Tower Street, E. C., shows various forms of the patent "Filtre Rapide," for household and other uses. The filter proper consists of asbestos cloth drawn over a perforated porcelain cone and tied with asbestos cord. This is coated with finely-powdered animal charcoal. To arrest the coarser suspended particles the water passes, at first, through a layer of granular bone-coal. The filter is easily cleansed and the filtering material renewed at a trifling expense.

For use on the larger scale the asbestos cloth is stretched over metal frames, which are, for all practical purposes, flattened cones, arranged in batteries, to filter any required quantity of water. The largest scale on which this filter has yet been employed is in filtering water for the aquarium at the present exhibition. A series of twenty frames, arrayed as shown in the diagram, are employed, and the filtering capacity is 700 gallons per hour. The water which is here filtered is previously softened by the addition of a powder, the composition of which is kept secret, but which appears to be a mixture of lime with other chemical

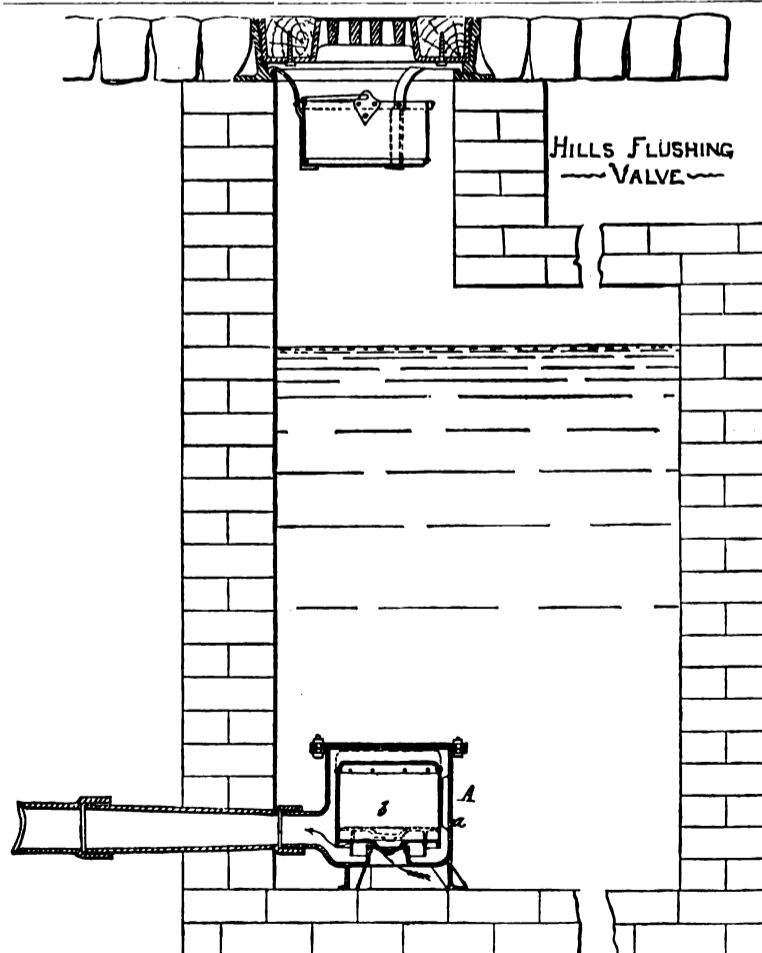


FIGURE 1.

there is a great variety of domestic filters there is very little new, either in the material employed or in the principle on which the filters operate. The most common material is animal charcoal, granular or in blocks, and the filtration takes place upward, downward, or sideways, according to the caprice of the maker, or, in some cases, apparently to imitate without copying. These filters are adapted to serve as pocket-filters, decanter-filters, table-filters, cistern-filters, tank-filters, filters for high pressure, filters for low-pressure, etc.

Among the faucet-filters we notice one of American make, the Grant Revolving-Ball Filter, well-known to readers of THE SANITARY ENGINEER, exhibited by the Revolving-Ball Filter Company, 23 Cornhill, E. C.

No. 417. The Spongy-Iron Domestic Filter Company,

substances. The service-pipe discharges on an overshot wheel, the revolution of which turns a screw, which forces the powder, in proper proportion, into the water to be softened. The mixture then flows upon the filters in which the carbonate of lime and other sediment is retained.

No. 430. Messrs. S. H. Johnson, Stratford, London, E., exhibit Patent Carbon-Paper Water-Filters, in which the filtering medium employed is thick filter-paper, with the pulp of which there is incorporated, during manufacture, a quantity of animal charcoal, which has been freed from phosphates by washing with acid. From 10 to 20 per cent. of the finished paper consists of animal charcoal. The filtering apparatus is of two descriptions. One form is a small press, containing from four to twelve chambers, each provided with a disk of the carbon-paper on either side. These presses are intended for insertion in the house-main, and filter all the water used for domestic purposes. The cut (Fig. 4) represents such a press attached to a vertical wall, but they may be placed upon the floor if more convenient. The operation of removing the disks and inserting fresh ones is easily and quickly effected. The second form of apparatus is what is called a draw-off filter. It contains but a single chamber and is screwed against a cast-iron plate fixed upon the wall, and suffices to filter the water drawn in small quantities for drinking purposes. The filters are furnished of two sizes, six and nine inches in diameter respectively. At the stand where these filters are shown are two tubes ten feet or so in length, containing, in the one case, London water, plain and simple, and in the other, some of the same water which has passed through one of these filters. Light is thrown through the tubes on a reflecting mirror, and the observer is supposed to notice that the unfiltered water is colored yellow, while the filtered water is colorless. We must confess that the device is more striking than the difference in color. The several filters described are to be obtained in the United States of Messrs. John Johnson & Co., Franklin Square, New York.

High-pressure filters to be connected with the general service of the house and to be cleansed by a reversal of the current are exhibited by Messrs. Doulton & Co., Lambeth, London, S. E.; Andrew Bell, 18 Tib Lane, Manchester (No. 437); J. Halliday, Water Street, New Town, Manchester (No. 451), and others.

FILTER-PRESS FOR SEWAGE-SLUDGE.

In the building of the Manufacturers' and Millowners' Mutual Aid Society, Messrs. S. H. Johnson & Co. (whose New York agents are John Johnson & Co., Franklin Square, near Cherry Street) exhibit presses for the filtration of sewage-sludge, which is the bugbear in all processes for the chemical treatment of sewage by precipitation. The wet sludge, after drawing off the defecated liquid as completely as practicable, contains from 90 to 95 per cent. of water, and is most readily got into manageable form by the use of a specially adapted filter-press, such as shown by Messrs. Johnson & Co. Like other presses, this also consists of a number of narrow cells held in a suitable frame, the interior surfaces communicating with an outlet and being covered with the cloth which serves as a filtering medium; the matter operated upon is introduced through a common feed and the liquid can reach the outlet only by passing through the cloth on which the solid particles are retained. In this press the plates are provided with three projections, as shown in Fig. 5, which, when the machine is screwed up, nip the interposed filtering-cloth between them and form a series of stays from one end of the machine to the other. Although this seems a small matter it is very important. If the feed passages become stopped owing to the heterogeneous character of the suspended matter in the sewage, the inevitable consequence is a destruction of the equilibrium of the pressures on the opposite sides of the plate, and the plate even under moderate pressures is liable to break unless made of a thick-ness which is quite impracticable.

The cut, Fig. 6, represents the general appearance of a plant of sufficient capacity to deal with the sludge from a population of 30,000. It is claimed that with such a plant thirty tons of wet sludge can easily be treated in ten hours. The labor required is about two-thirds the time of two men, and the boiler-power is ten horse-power actual. The sludge is drawn, or rather forced, by atmospheric pressure into cylinders set beneath the presses, and from which the air has previously been exhausted. From these cylinders it is driven into the presses by means of compressed air at a pressure of from 100 to 200 pounds per square inch. The press is thus filled instantaneously, filtration begins at once, and the treatment of the charge is completed at the end of an

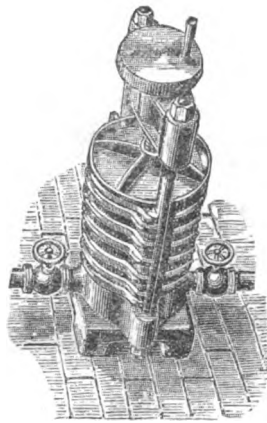


FIG. 4.

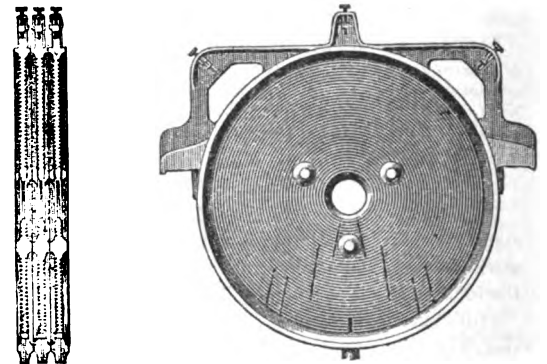


FIG. 5.

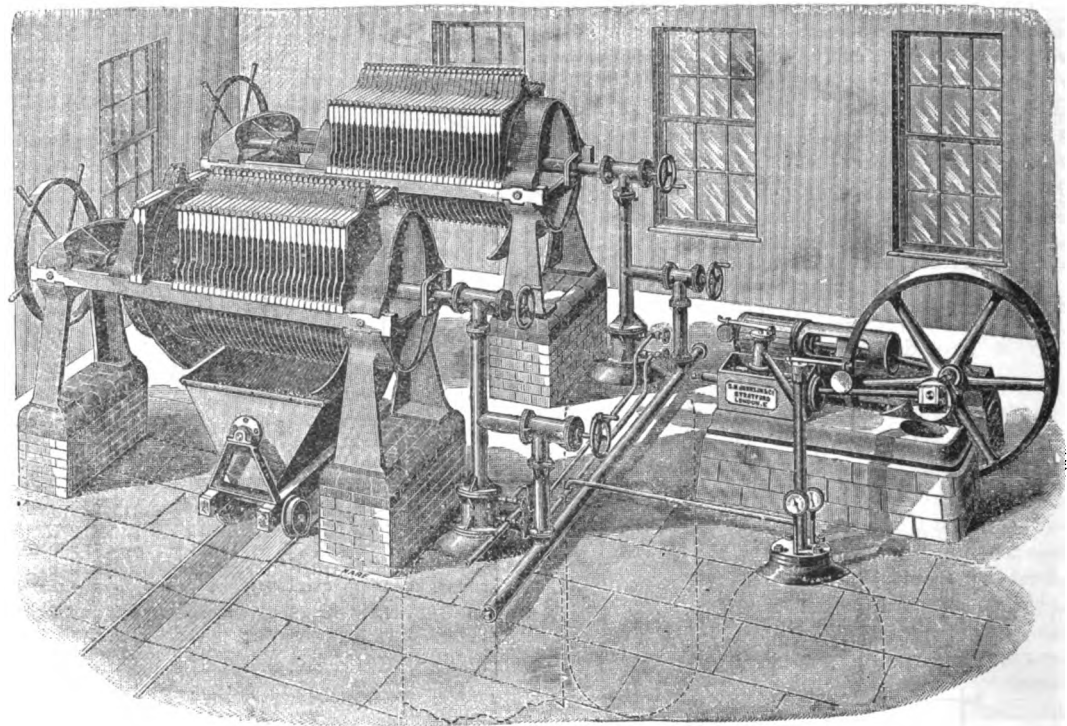


FIGURE 6.

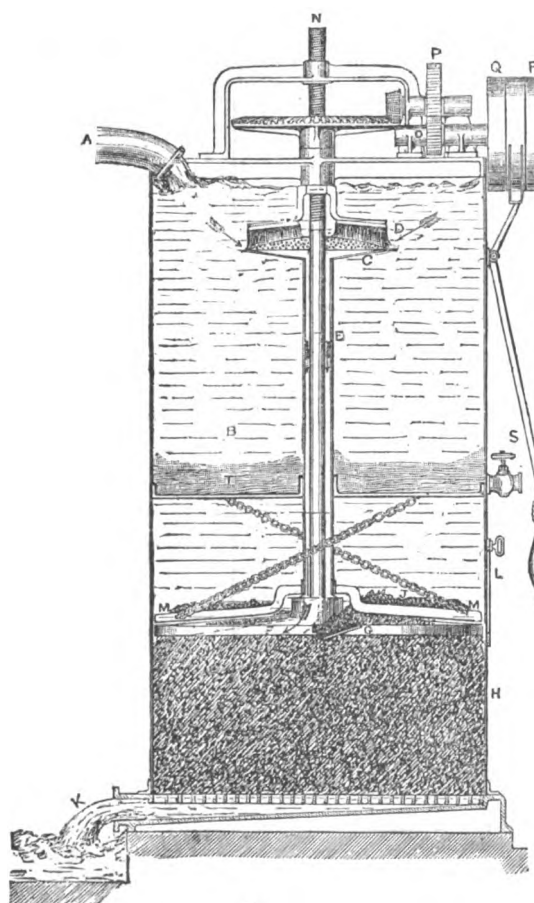


FIG. 7.

A.—Inlet-Pipe for unfiltered liquid.
B.—Top chamber of Filter, receiving the unfiltered liquid, the heavier particles in which gravitate to the bottom of this chamber, as shown.

C.—Fine perforated funnel for admitting the lighter portion only of unfiltered liquid on to filter-bed.
D.—Rotating Brushes for keeping funnel C free from clogging.
E.—Telescopic Pipe for allowing descent of funnel at close of operation to admit unfiltered surface liquid C to underside of Cutter-Plate.
F.—Cutter-Plate.
G.—Knife on Cutter-Plate.
H.—Filter-Bed.
J.—Portion of Filter-Bed shown as cut up by knife G.
K.—Filtered liquid.
L.—Manhole for filling in or taking out the Filter-Bed.
M.—Stationary Knives, fitted with chains to bottom of top chamber B for keeping free the passage in front of knife G.
N.—Screw-Spindle carrying Cutter Plate.
O.P.—Pinion and Wheel for reducing speed from the driving-pulleys Q.R.
S.—Valve for drawing off the thick sludge T formed in top chamber B, which sludge is thrown into solid dirty bed when removed.
The Inlet of liquid to be filtered is distributed around the whole circumference of the top chamber. This arrangement prevents any disturbance below the surface, and consequently precipitation is not interfered with. This is not shown in the drawing.

hour, when the cake is removed and a new charge introduced.

The solid matter as it leaves the press is in the form of a hard-pressed cake containing from 45 to 50 per cent of water. It is practically inodorous and can be readily handled. Exposed to the air it gradually becomes drier, until the air-dry cake finally contains about twenty per cent. of moisture. The value of the material as a manure is not such as to warrant transportation to any considerable distance. It is said to have a value equal to that of farm-yard manure.

WEST ANNEX—SEWAGE-FILTER.

No. 1,252. Messrs. Bateman & Levick, Cornhill Chambers, White Lion Court, E. C., exhibit, in operation, the Farquhar-Oldham Filter for continuous and rapid filtration of water, sewage, and other liquids containing solid matter in suspension. It is shown in Fig. 7. The essential features of this filter are the use of an inexpensive filtering material and the continuous removal, by mechanical means,

of the deposit which would collect upon the surface, gradually lessening and ultimately putting an end to the filtration. This is accomplished by a revolving-knife or cutting-plate, which pares off a thin surface-layer from the filter, and whose descent is regulated and effected by machinery, or, in the smaller filters, by hand. The material removed accumulates above the cutting-plate, and, when the filter requires filling, may be removed in a single mass.

THE TREATMENT AND UTILIZATION OF SEWAGE.

The present exhibition offers no very great facilities for the study of the sewage question. There are a number of exhibits of appliances in connection with sewerage, materials, flush-tanks, pumps, wagons for the removal of refuse, etc. The city of Paris has a very complete exhibit of plans, models, and utensils to illustrate the system of sewerage there employed; it shows also, as far as it is possible to show, the results of the experiments on irrigation, which have now for many years been conducted on the plain of Gennevilliers. Diagrams show the increase, from year to year, of the amount of land irrigated and of the amount of sewage-water pumped on the land. Specimens are also shown of the sewage and of some of the sewage products. So much for irrigation, when it comes to throwing the sewage away. In the South Annex, Messrs. Henry Green & Son, 155 Cannon Street, E. C. (exhibit No. 483), have a working model to illustrate the invention of Mr. C. Maynard Walker, by which the rise and fall of the tide is utilized for the lifting of sewage or effluent water and discharging it into the sea.

The Manchester Corporation (East Annex, exhibit No. 524) exhibits a series of models and samples to illustrate the working of the "pail system," also samples of the concentrated manure, and of the vegetables grown with it, samples of mortar, bricks, oil, candles, and cement, made by the utilization of house-refuse.

The hold which precipitation processes still have in England is illustrated in various ways. The Native Guano Company (exhibit No. 1,082) still maintains the efficacy of the A, B, C process, which is now employed at Aylesbury, and solely at Aylesbury, as far as we know; the Manufacturers' and Millowners' Mutual Aid Association (exhibit No. 1,081) shows many samples of the results of the chemical purification of waste liquids, the great point being the filtration of the sludge, the bugbear of all processes of chemical treatment. We have described elsewhere the presses of S. H. Johnson & Co., which claim efficiently to deal with this matter. Among the many plans proposed for dealing with the very pressing question of the pollution of the lower Thames by the sewage of London is one for treating the sewage with precipitants (lime, salts of iron, and alumina) and filtering the sludge with these presses.

(TO BE CONTINUED.)

Correspondence.

EXPANSION OF WATER IN BOILERS.

CHICAGO, August 10, 1884.

To the Editor of THE SANITARY ENGINEER:

I HAVE a number of horizontal boilers, 48 inches in diameter by 16 feet long, in which the increase in bulk of water is very apparent when the boilers are first warmed up. What I desire to know is—should I fill a boiler with water at a temperature of say between 40° and 50° Fah. to "two cocks," or, in other words, to the second gauge, how may I calculate how much higher the water will be due to expansion only when steam is up to 60 pounds pressure? An early answer to the above, through the columns of your journal, will be thankfully received.

Very respectfully yours, ENGINEER.

[You have not sent us sufficient data to give anything like an accurate reply. In fact, we do not see how we could give a fair approximation without a drawing of your boiler-heads, showing the size and number of tubes, and the positions of the water-gauges. When the bulk of water at 40° Fah. is 1,000, the bulk at 307° (60 pounds of steam) will be 1,090. But from this must be taken the quantity of water which has been made into steam to fill the steam-space of the boiler; and the enlargement of the boiler itself, due to the increased heat, will enter into the problem, though not to a very great extent.]

HEAT OF STEAM FOR DIFFERENT CONDITIONS.

PROVIDENCE, R. I., August 20, 1884.

To the Editor of THE SANITARY ENGINEER:

A DISPUTE has arisen between two local engineers and myself with regard to the value of steam for heating under different conditions, and as we cannot agree, we have decided to refer the matter to you for a decision. A claims that one-pound weight of low-pressure steam, say at 5 to 10 pounds above atmosphere, will warm more air when condensed to water than if the steam was high pressure, 50 or

60 pounds. B claims that the high-pressure steam, being the hottest, must be able to warm more air; and I claim that as "the heat of steam is the same for all pressures," there can be no difference. Who is right?

Yours truly,

STEAM-HEAT.

[If a pound weight of steam at seven pounds pressure above atmosphere is condensed to water at the same temperature as the steam (232° Fah.), 952 units of heat have been realized. If, on the other hand, steam at 60 pounds pressure is condensed to water at 307° (the temperature of the steam), only 899 units of heat are realized. This is on the supposition that the steam is condensed to the temperature of its water only, and A is right. But from your letter we cannot say that B takes that view of it, and should he consider, or be of the belief, that the steam in both cases would be cooled to the same temperature—say water at atmosphere—he (B) would be right; as in that case the units of heat from 60 pounds pressure of steam to water at 212 will be 985 per pound of steam; while steam in cooling from seven pounds to the same temperature gives off but 972 units.

With regard to yourself, the heat of steam is not the same for all pressures, as at 200 pounds per square inch the total heat of steam is very nearly 1,200 heat-units, counting from the freezing point, whereas with steam at atmosphere or a pound above it, 1,147 heat-units is all that can be realized from it by cooling it to 32° Fah.

WHERE A TEST-GAUGE SHOULD BE APPLIED TO A BOILER.

NEW YORK, August 19, 1884.

To the Editor of THE SANITARY ENGINEER:

PART of "Rule 40" of the General Rules and Regulations of the Supervising Inspectors for Steam-Vessels reads: "In applying the hydrostatic test to boilers with a steam-chimney, the test-gauge should be applied to the water-line of such boilers."

What we desire to know is, why is the gauge would not be just as well screwed into the head of the steam-chimney or dome as at the water-line? What real difference can it make? An answer through your paper will settle a difference of opinion, or, it may be, inform us on a matter that we should be already masters of.

Very respectfully yours, J. M. & P. M.,
Steam-Fitters' Helpers.

[The object of the provision of the rule above stated is to provide that the boiler will be subjected at all its parts to as near as possible the pressure required by law. When a boiler is just filled with water there is a pressure at its bottom of one pound for every twenty-seven inches in height the boiler may be, and no pressure at its top. If, then, a boiler is twenty-two and one-half feet from the water bottom to the top of the steam-chimney—not an unusual thing in marine boilers—there will be a pressure of ten pounds per square inch on a gauge at the bottom of the boiler before the pump is at all applied. If thereafter the pressure is applied and this gauge registers forty pounds, there is but a pressure of thirty pounds at the top of the dome. On the other hand, if the gauge was attached to the highest point, and fixed at that level, there would be actually fifty pounds per square inch at the bottom. For this reason the water-line is taken as the best position for the gauge.

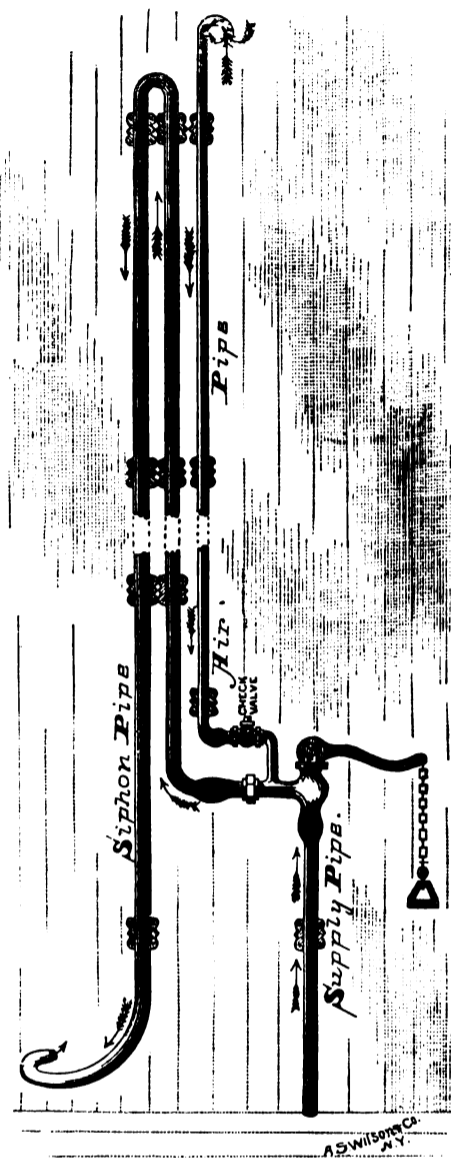
It is not absolutely necessary that a hole should be made in the boiler at this position, but the gauge must occupy that level, and the gauge-pipe be full of water, that the head of water within it may act with or against the spring of the gauge, as the case may be.]

Novelties.

SYPHON-FLUSHING DEVICE.

OUR illustration this week shows a novel contrivance intended to take the place of a spring-valve for water-closets, etc., and to secure an "after-wash." It is composed of an automatically-closing valve, shown on the head of the supply-pipe, whose outlet is bifurcated into a direct and a side branch. To the direct branch is attached a suitable number of feet of 3/4-inch pipe, forming a syphon, as shown, the longer leg of the syphon terminating at the water-closet bowl. To the side branch is fixed a specially-designed check-valve, to which is to be added a 1/2-inch air-pipe, extending not less than three inches above the top bend of the syphon. The check-valve opens inward, or, in other words, in the direction to prevent the water from the spring-valve passing into the air-pipe when the former is opened. The action is as follows: When the spring-valve is opened, by a pull or otherwise, the water passes into the water-closet basin and pan through the syphon-pipe, and continues to run as long as the valve is

held open. When the handle is dropped the water still remaining in the syphon-pipe runs out by air entering the air-pipe and check-valve, giving the after-flush and sealing the pan. A water-trap in the syphon-pipe, close to the bowl, is recommended to prevent the back-passage of air

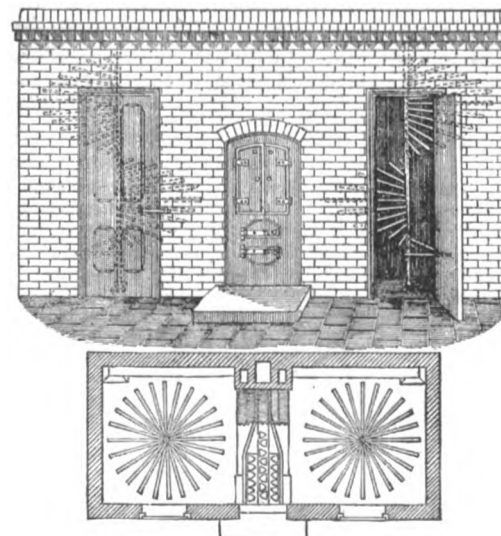


from the bowl into the supply-pipe, should the head of water be unconstant, compelling the passage of air through the air-pipe and check-valve.

The brass-work shown is all that is to be supplied by the manufacturer, the plumber supplying and arranging the remainder, which may be in a perpendicular form when the height of the room admits, or which may be in the form of any convenient coil on the side-wall.

The inventor is Mr. Alphonse Major, 232 William Street, New York City.

WE take from the *Builder* this illustration of a drying-closet made by Messrs. Bradford & Co., High Holborn,



London: "We give a view and plan of one of the double closets, the plan being on a reduced scale. The entrance-

door may be placed, where convenient, in the return ends or at the back of the structure, as the radial horse in the centre of each compartment (shown on plan and by the dotted lines through brick-work and doors) revolves in any direction. The heating-stove, specially contrived for the purpose, is fixed between the 'radials.' There are twenty-four arms to each 'radial' horse, so that one of them, six feet in diameter, contains seventy-two feet of drying-rail. The linen is placed upon each arm without the necessity of the laundress entering the closet. Means are provided to carry off the steam from the clothes."

Reviews of Books.

QUARANTINE AND SANITARY OPERATIONS OF THE BOARD OF HEALTH OF THE STATE OF LOUISIANA, during 1880, 1881, 1882, and 1883. By Joseph Jones, M. D., etc. 8vo. Baton Rouge, 1884.

Although this forms a volume of nearly 400 pages, it is given as being merely an introduction to the annual report of the board for 1883-4. It contains little that is new, the great bulk consisting of extracts and tables scissored from other documents, and from the reports published in the daily papers of the voluminous resolutions and proclamations fulminated by the board during the last four years.

It is written in the style of certain tracts and campaign documents, with a profuse use of italics and capitals, and in this respect, as in its verbosity, is a model of what should be avoided in a health report. It contains, however, a very considerable amount of historical and statistical information with regard to the health of New Orleans and with regard to the Mississippi quarantine, but the statements with regard to the latter are intensely partisan, and present but one side of the question.

An interesting document contained in the book is a copy of a report on a proposed system of drainage for the first drainage district of New Orleans, made in 1858 by Maj. G. T. Beauregard. (P. cclxxxix.)

According to Dr. Jones, the drainage canals now within the city aggregate about 22½ miles in length, and without the city limits about 12½ miles, making a total of about 35 miles in length. The average width of these canals appears to be about 25 feet; they are not uniform in depth or grade, and they contain large deposits of organic matters.

Dr. Jones declares that out of a total of 242,426 deaths in New Orleans during the last 34 years nearly one-half (118,093) were caused by preventable diseases, the remedy for the diminution of the same being effective drainage, and that from these diseases New Orleans has lost during that period \$118,094,000.

This is, of course, exaggeration, but no doubt the unnecessary loss of life and money has been very great, and the commercial prosperity of the city has been checked to a corresponding degree. No doubt, if some ten to fifteen millions of dollars could be expended in sanitary engineering work in New Orleans, and if the continuation and care of these works could be kept out of politics and in the hands of competent and honest men, it might be made a fairly healthy city, with an annual mortality-rate not exceeding 23 per 1,000, and with a great diminution from malarial diseases and in the risks of yellow fever epidemics. No doubt, also, under such circumstances, the paying of this money would be an exceedingly good investment, one that shrewd business-men would be glad to make if they could reap the profits. But the probabilities that the majority of the present inhabitants of the city will raise the money are so infinitesimally small that they are not worth considering; in fact, we have great doubts whether the majority of the present residents of the city who were born in it really desire any radical change.

The business-men want to have improvements made; their names will be found on the roll of members and subscribers of the Auxiliary Sanitary Association, but it is a small list in comparison with the population of the city; and it should not be forgotten that this organization has been steadily and virulently opposed by Dr. Jones and his followers, who would allow of no improvements unless they can boss the job and handle the funds. Upon the whole, we are not hopeful as to the sanitary improvement of New Orleans. It is a special defect in yellow fever epidemics occurring in a place through a long series of years that they are apt to lead to the survival of the unfittest, for sanitary improvement at least.

PHILADELPHIA PAVEMENTS. Report of the Board of Experts on street-paving. To Hon. William B. Smith, Mayor of Philadelphia. July 8, 1884.

On June 13, 1884, the Common Council of Philadelphia authorized the Mayor to "obtain from three engineers, dis-

tinguished for their knowledge and experience of pavements, a written opinion and report concerning the subject of pavements in Philadelphia," such opinion and report to be based on an examination of the present condition of the streets, to point out defects of the present system, to specify the best system of pavement for the city, and the cost of the same. The Mayor selected Gen. Quincy A. Gillmore, U. S. A., who has studied and written extensively on the subject of pavements; Capt. Francis V. Greene, U. S. A., who has had valuable experience in charge of the pavements of Washington, D. C.; and Mr. Edward P. North, M. Am. Soc. C. E., who has had much experience and made a careful study of the subject of city pavements. Such men as these do not need to occupy much time in groping after facts or searching for conclusions, and are not compelled to cover up their own incompetency by voluminous disquisitions on the theory of pavements, illustrating by quotations from the opinions of others. They went right to work, and in three weeks they handed in their report of sixteen pages, which goes directly to the point without a superfluous word, and contains a complete reply to all the questions asked them, and is, in fact, a manual of street-paving in itself.

While full, the report is so concise that it is difficult to make an abstract without quoting it entire, but as a general summary, it may be said that the board found 573 miles of paved streets, of which 93 per cent. were paved with cobble-stones, badly assorted, poorly laid, and wretchedly maintained. They recommend a gradual and systematic replacement of cobble-stones by granite blocks laid on compacted gravel, and with tar-filled joints. They advise that the repairs of cobble-stone pavements be made by contract under exact specifications, instead of for a lump sum per annum. They advise against any attempt to "improve" cobble-stone pavements by a "poultice pavement," and they do not approve of wooden pavements. They recommend that one-eighth of the streets be paved with sheet asphalt, and a small portion with asphalt blocks. They estimate the cost of repaving at about \$21,000,000, which may be profitably expended in eleven years.

As the carefully-expressed opinion of experts in their branch, the report is worthy of study by every city engineer, and is worth reproducing in permanent form.

If the city authorities of Philadelphia will only heed its recommendations, they may remove from their city one of its most objectionable features; but it is to be feared that the advice given is both too advanced and too conservative to be acted upon promptly and judiciously by a legislative body accustomed to a different method of doing things.

REPORT UPON THE STATE OF PUBLIC HEALTH AND THE SANITARY WORK PERFORMED IN DUBLIN during the year 1883; also Twenty-second Annual Report upon the Analysis and Inspection of Food, etc. By Charles A. Cameron, Medical Officer of Health, etc. 106 pp. 8vo. Dublin, 1884.

This is a very condensed report, much of it being in the form of statistical tables, and contains a great deal of information, with very little exhorting or padding.

The city of Dublin includes an area of 3,754 acres, and has a population estimated at 250,557 in the middle of 1883, which gives 65.8 persons per acre. At the census of 1881 the city contained 24,211 inhabited and 3,060 uninhabited houses. From a survey made by Dr. Cameron in 1882, it appears that there were then 7,284 houses occupied by two or more families, and which, therefore, come under the denomination "tenement-dwellings." These houses contain 88,116 rooms, occupied by 32,202 families, somewhat more than three-fifths of the total number of families in the city. The birth-rate of the city for the year was 31 per 1,000, while the rate in the suburbs was only 22 per 1,000. The death-rate in the city was 31.5, and 30 per cent. of the deaths were of children under five years of age. Whooping-cough caused a greater mortality than any other zymotic disease, giving a rate of 1.1 per 1,000 of population—i. e., 276 deaths. Typhus fever caused 130 deaths, scarlet fever 151, enteric fever 93, and diphtheria 8.

The total number of houses unfit for habitation, which have been detenanted and closed from August 31, 1879, to December 31, 1883, was 1,616. The corporation has decided to commence the erection of a block of buildings for workpeople, the estimated cost being £25,000.

During the year 700 articles of food, etc., were analyzed, and 93 were found adulterated. These included 577 specimens of milk, of which 89 were adulterated; 7 of butter, of which 3 were adulterated, and 13 of tea, 30 of pepper, 27 of coffee, 31 of mustard, and 12 of drugs, none of which were found adulterated. A good feature of the report, which we commend for imitation to our health

officers, is the giving the list of the names and addresses of those convicted of selling adulterated food.

The average composition of the Vartry pipe-water for the year is given as follows: One imperial gallon (70,000 grains) contained 4,430 grains total solid matters, including

Albuminoid ammonia.....	0.006 grains.
Saline ammonia.....	0.002 "
Nitrites and nitrates.....	traces.
Chlorine.....	0.098 "

An interesting appendix to the report is given in the form of a paper by Spencer Hart, C. E., Assistant Engineer to the Corporation, entitled, "Some Considerations on the Working of the Artisans' Dwellings Acts, as illustrated in the case of the Coombe Area (Dublin)." This Coombe Area was a low-lying region, containing 110 dwellings in very bad sanitary condition. The total cost to the corporation of this property was a little over £24,000. After the ground had been acquired and cleared, it was rented to the Artisans' Dwellings Company on a lease of 10,000 years for £200 per year. The company has expended £27,600 in buildings, and the rental which they receive for these buildings is £2,680 per year. The former Government valuation of the Coombs Area was £424, and the average taxes collected annually amounted to £63. The total rates paid for 1883 amounted to £611. The population has increased from 984 to 1,100. The health of the district has greatly improved, and, while it was formerly a fever-nest, there was no death from zymotic causes in it during the last half year, and only eleven deaths in all. We specially commend this paper of Mr. Hart's, and his description of how the work was done, to those who are interested in the subject of providing decent habitations for the poor in our own large cities.

TENTH ANNUAL REPORT OF THE STRATFORD-ON-AVON COMBINED SANITARY DISTRICT. By G. H. Fosbroke, Medical Officer of Health. 65 pp. 8vo. Evesham, 1884.

This combined sanitary district includes Evesham, and in 1881 had a population of 54,149. The birth-rate for the year 1883 was 32.1, and the death-rate 15.2 per 1,000. The proportion of children who died under one year of age to births registered during the same period was 8.6 per cent., varying from 13.7 per cent. in Evesham rural to 62 in Stratford rural district. The proportion of deaths from zymotic diseases was low. An arrangement has been made with the medical men of the district by which they voluntarily furnish notification of cases of infectious disease. Mr. Fosbroke says that this system furnishes valuable information and is approved by the physicians, but he expresses a desire that this notification should be made compulsory by Act of Parliament, though admitting that there is opposition to this on the part of some of the medical profession. If the present system is satisfactory it is not easy to see why a change is desired, especially as the district does not seem to have provided satisfactory hospital accommodation for cases of infectious disease.

The greater part of the report is devoted to matters of local interest and reports of the inspectors of nuisances of the several sub-districts.

REPORT ON THE SANITARY CONDITION OF THE URBAN DISTRICT OF CHELTENHAM, for the year 1883. By Thomas Wright, M.D., Medical Officer of Health. 46 pp. 8vo.

The population of Cheltenham is estimated at 45,700; the number of births registered during the year was 1,136, which is equal to a birth-rate of 24.85 per 1,000, of which 4.5 per cent. were illegitimate. The number of deaths was 844, giving a death-rate of 18.44. To every 100 births there were 18 deaths under 1 year of age. This is a favorable showing, and the tables show that zymotic disease has been rare.

In view of the possibility of the appearance of cholera in England, and in accordance with the circular of advice issued by the Medical Officer of the Local Government Board, a special inspection of houses was made, and a general cleaning up insisted on, which would seem to have had a good effect. While this report is mainly of local interest, Cheltenham has enough importance as a health resort to make an account of its sanitary condition of importance to many non-residents, and we are glad to see that this account is so satisfactory.

WE have received the fourth edition of "Heating by Artificial Means," by Mr. James Keith, manufacturer of hot-water apparatus, of London and Edinburgh, which is a review of the principal methods of warming rooms and buildings from the standpoint of a hot-water engineer.

It advocates the low-pressure system of warming by water with what is considered a "quick-circulating" boiler, and contains many hints on ventilation.

It is for gratuitous circulation among those contemplating the use of warming-apparatus and for architects and engineers.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING AUGUST 30, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	9	13.3	6	46.6			1		2									1		2		
Boston	Mass.	435,000	204	24.4	90	44.1	10	1	19		48	7			4	5		4	1				8	
Lowell	Mass.	71,500	31	22.5	21	67.7		3	4		9				1	1								
Worcester	Mass.	69,000	30	22.6	13	43.3			1		11	3			1	1		1			1			
Fall River	Mass.	67,000	28	21.7	20	71.4	1		1	1	8							1						
New Haven	Conn.	69,500	39	29.2	18	46.1	1		4		10				2	1								
Providence	R. I.	125,000	52	21.6	30	57.6			6		18				1	1		2					1	
Total		872,000	393	23.4	198	50.3	12	4	36	1	106	10	1	13	8	8		8	1	2	1	2	9	
EASTERN CITIES.																								
Albany	New York	103,000	35	17.7	9	25.7	2		5		6	1		2			1		1					
New York	New York	1,355,000	692	26.6	373	53.9	27	5	105	12	146	18	1	11	4	6	39	15	7	13	5		14	
Brooklyn	New York	670,000	282	21.9	140	49.6	5		46	1	74	4		5	3	2	9		7	2	3		6	
Hudson County	New Jersey	225,000	93	21.5	43	46.2	2	1	11		14	3		4	1	3	4	1	1		1		1	
Newark	New Jersey	154,000	55	18.6	20	36.3	1		5		11	5		2			1	2			1			
Philadelphia	Pa.	940,000	366	20.2	144	39.3	9	9	65	5	82	13		11		1	6	2	5		3	1	7	
Wilmington	Delaware	50,000	24	25.0	11	45.8	2	2	6		6													
Total		3,497,000	1,547	23.0	740	47.8	48	17	243	18	339	44	1	35	8	12	60	3	31	15	13	1	28	
LAKE CITIES.																								
Buffalo	New York																							
Rochester	New York																							
Cleveland	Ohio	270,000	88	21.8	60	68.1	2		6	1	27		1	1			5							
Detroit	Michigan	140,000	58	21.5	39	67.2			2		17	6		3		1	1			2			3	
Chicago	Illinois	650,000	270	21.6	155	57.4	4		18	3	73	8	1	12	2	4	5		5		10	3	2	
Milwaukee	Wisconsin	147,000	80	23.3	59	73.7			8	1	22	2		1		1	3	1	3		1		2	
Total		1,147,000	496	22.5	313	63.1	6		34	5	139	16	2	17	2	6	14	1	8		13	4	7	
RIVER CITIES.																								
Pittsburg	Pa.	210,000	85	21.0	46	54.1	5	1	5		13	12	1		3	1	2	1		2	3		2	
Cincinnati	Ohio	275,600	109	20.6	46	42.2	5		10	2	14	1		1	2	7	1				2		1	
Louisville	Ky.	137,000	51	19.8	20	39.2		2	6		1			5		1	1							
Indianapolis	Ind.	94,000	28	15.5	14	50.0		1	4		1	1						1						
Minneapolis	Minn.	100,000	39	20.8	24	61.5	1		2		10	1		5			2	1					2	
Evansville	Ind.	34,000	9	13.7	4	44.4			1		2		1	2	1									
St. Louis	Mo.	375,000	136	18.8	55	40.4	11		16		18	1		4	4	5	1	4	1					
Total		1,225,600	457	19.4	209	45.7	22	4	44	2	59	16	2	17	8	9	13	8	1		2	5	5	
SOUTHERN CITIES.																								
District of Columbia	Wh	133,800	56	21.8	29	51.7	1		4		8	1		5	1	3					1			
Richmond	Va.	69,300	44	33.0	29	65.9		1	8		6	3		1					1				2	
Charleston	Col.	41,000	16	20.3	4	25.0			7					3			2							
	Wh	32,400	18	28.9	10	55.5					1			1			1							
	S. C.	25,000	8	16.6	4	50.0	1				1			1					1					
Atlanta	Geo.	27,800	24	44.9	10	41.6			2		3			1							1			
	Wh	30,000	7	12.1	4	57.1	1		2		2													
Augusta	Col.	20,000	23	59.9	13	56.5					12			2	2									
	Wh	20,000	6	15.6	4	66.6			1		1													
Savannah	Col.	15,000	7	24.3	3	42.8			1		3				2									
	Geo.																							
Nashville	Tenn.	35,100	16	23.7	8	50.0			4		3	2			1									
	Wh	21,300	11	26.9	4	18.1			4		4			2										
New Orleans	La.	171,000	76	23.1	21	27.6	1		8		8	2		11			1		1					
	Col.	63,000	44	36.3	18	40.9	1		4		3			1	3				2	1			1	
Total White		455,900	185	21.1	74	40.0	4		20		23	5		9	13	3	3		2		1			
Total Colored		248,800	171	35.8	85	49.7	1	1	19		30	4		5	8		1		2	2		1		
Total in 32 U. S. Cities		7,446,300	3,249	22.7	1,610	49.8	93	26	306	26	606	95	6	96	39	38	99	12	52	3	32	25	3	
Total for 4 weeks ending August 30		7,248,675	13,190	23.6	6,667	50.6	419	1416	103	2632	288	34	96	171	116	406	70	204	10	3	128	105	5	
August 16.	Total in 28 English Cities	8,762,354	4,052	24.1			119				789	21		68		49				103		10	68	
" 16.	8 Scottish Cities	1,254,607	499	20.7			10				51	5		6		9				9			29	
" 16.	16 Irish Cities	858,660	335	20.8			8		32		34			3					64				3	
" 16.	139 German Cities																		50					
" 16.	15 Swiss Cities																							
" 16.	15 Swiss Cities	455,537	177	20.2			9		28		39	2		8		2			7			1	1	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending August 30, 1884, in 32 cities of the United States, having an aggregate population of 7,446,300, there died 3,249 persons, which is equivalent to an annual death-rate of 22.7 per 1,000, a decrease from that of the preceding week, and also less than the rate for the month. Of the decedents 49.8 per cent. were under 5 years of age, the proportion of this class of deaths being highest in the Lake cities—viz., 63.1 per cent. The rate in the North Atlantic cities was 23.4, in the Eastern cities, 23.0; in the Lake cities, 22.5; in the River cities, 19.4; and in the Southern cities, for the whites 21.1, and for the colored 35.8 per 1,000.

Accidents caused 2.8, consumption 12.1, diarrheal diseases 21.4, and diphtheria 2.9 per cent. of all deaths. Diarrheal diseases caused 26.9 per cent. of all deaths in the North Atlantic cities, 21.2 per cent. in the Eastern, 27.9 in the Lake, 12.9 in the River, and in the Southern cities 12.4 per cent. among the whites and 17.5 among the colored. Diphtheria caused 3.2 per cent. of the total mortality in the Lake cities, 3.4 per cent. in the River cities. Typhoid fever caused 2.9 per cent. of all deaths, the highest percentages being 3.4 in the Lake cities, 3.7 in the River, and 4.8 among the whites in the Southern cities. Malarial fevers caused 1.2, scarlet fever 1.1, pneumonia 3.0, bronchitis 1.5,

measles 0.6, puerperal diseases 0.7, and whooping-cough 1.5 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 34 new cases of typhoid fever, 56 of scarlet fever, and 14 of diphtheria.

DETROIT, MICH.—Dr. O. W. Wight reports 17 new cases of diphtheria and 10 of scarlet fever.

BALTIMORE, MD.—The weekly report of the Health Officer records 152 deaths, of which 62 were under 5 years of age. The annual death-rate for the whole population was 19.3 per 1,000, or 18.5 for the whites and 23.4 per 1,000 for the colored. Diphtheria caused 14 deaths, croup 1, scarlet fever 2, whooping-cough 2, typhoid fever 4, malarial fevers 5, diarrheal diseases 18, consumption 19, and violence 6.

MASSACHUSETTS.—During the week ending August 23, in 106 towns of the State, having an aggregate population of 1,264,429, there were 509 deaths, which is equivalent to an annual death-rate of 20.9 per 1,000. The number of decedents under 5 years numbered 240. The principal zymotic diseases caused 200 deaths, among which were diarrheal diseases 150, whooping-cough 16, typhoid fever 10, diphtheria 10, scarlet fever 5. The highest rates recorded were 33.1 in Fall River and 31.9 per 1,000 in Salem.

ENGLAND.—During the week ending August 16, the annual death-rate in the 28 large towns of England and Wales was 24.1 per 1,000. The highest rate, 43.3, was in Wolverhampton; the lowest, 17.4, was in Bristol. The highest annual death-rates from measles were 6.6 in Blackburn, and 3.3 in Wolverhampton; from diarrhoea 13.3 in Wolverhampton, 12.7 in Norwich, and 12.6 in Leicester. Small-pox caused 12 deaths in London and 1 in Sheffield.

LONDON.—Deaths, 1,634; annual death-rate, 21.2 per 1,000. The fatal cases of small-pox has steadily de-

clined, and for this week numbered 9, including 3 deaths in the hospitals. The number of cases in the hospitals numbered 677, against 843 for the preceding week, the number of new cases admitted being 70. The deaths from diarrheal diseases, which had declined in the four preceding weeks from 533 to 219, rose again to 242, and exceeded the average by 38. Measles caused 41 deaths, scarlet fever 19, diphtheria 19, whooping-cough 28, typhoid fever 32, consumption 163, diseases of the respiratory organs 162, and violence 47.

SCOTLAND.—The death-rate in the 8 principal towns for the week ending August 16 was 20.7 per 1,000. The lowest rate, 13.4, was recorded in Paisley; the highest, 25.0 per 1,000, in Glasgow.

EDINBURGH.—Deaths, 75; annual death-rate, 15.8 per 1,000. Diphtheria caused 1 death, whooping-cough 4, diarrheal diseases 7, and violence 2.

GLASGOW.—Deaths, 258; annual death-rate, 25.9 per 1,000. Measles caused 6 deaths, scarlet fever 9, diphtheria 2, whooping-cough 20, diarrheal diseases 27, acute lung diseases 32, and violence 13.

SCOTLAND.—The Registrar-General's report for the quarter ending June 30, 1884, records 18,751 deaths in Scotland, which is below the average of the corresponding quarter for the ten previous years by 0.166. In the 8 principal towns the deaths numbered 7,296; the highest death-rate was in Paisley—viz., 27.1 per 1,000, the lowest,

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Sept. 6...	25.30	18.44	23.02	27.89	28.08	18.56

E. G. LOVE, Ph.D., Gas Examiner.

It is proposed to form an association of the gas engineers of Ohio.

THE Berlin gas authorities have offered three prizes for the best designs for street-lamps.

At Port Rush, Ireland, a railway seven miles long is worked by electricity, generated by a waterfall and transmitted by wire.

A SLIGHT reduction in the price of gas to consumers has been made in Manchester, England, accompanied by an increase to 12½ per cent. in the dividends paid to stockholders.

THE Anglo-American Electric-Light Corporation of London—the original Brush Company in England—has gathered up the remains of its many defunct sub-companies, and proposes now to deal directly with the public.

THE New York Steam Company proposes to add electric-lighting to its business of furnishing steam for heat and power. Relations have been entered into with the Sawyer-Mann Company, and two up-town stations will be built, from which it is intended to supply Fifth Avenue; one at Thirty-first Street, near the East River, and one on Twenty-ninth Street, between Sixth and Seventh Avenues.

THE following facts relate to the working of the Gas-Light and Coke Company of London, for the six months ending June 30, 1884:

Coal carbonized, common, 765,439 tons; Cannel, 21,231 tons. Gas made, common, 7,903,772 thousands; Cannel, 321,296 thousands. Residuals, coke, 928,255 chaldrons; breeze, 94,652 chaldrons; tar, 8,690,081 gallons; ammoniacal liquor, 229,357 butts. Number of public lamps, 45,270.

AT the half-yearly meeting of the Gas-Light and Coke Company, of London, the revenue account showed that the total receipts for the half-year ended June 30 last had been £1,552,644. After providing for all fixed charges, the directors recommended a dividend on the ordinary stock at the rate of 12 per cent. per annum, which would enable them to carry forward £188,929. The chairman stated that the past half-year had not been a favorable one, from the gasmaker's point of view, owing to the bright weather, and the increase in the gas sold had been only at the rate of 3.87 per cent., against 5.22 per cent. in the June half of 1883.

M. LEFEBVRE, Engineer of the Paris Gas Company, in experimenting with atmospheric and lighting burners, found that with a common fish-tail-burner, 31.8 litres of gas were required to raise a litre of water from freezing to the boiling point. With an atmospheric burner 39.6 litres of gas were required. He also experimented with gas to which increasing proportions of hydrogen had been added, and found that as the hydrogen increased the heating power of the mixture was diminished. The contrary was found to be true by the addition of heavy carburetted hydrogen. The larger the proportion of this gas present in the mixture the greater its heating power.

AN electric-light house has just been completed at the entrance to the Bay of Rio Janeiro, Brazil. It stands on the island of Raza and is 85 feet high, resting upon a rock 230 feet above the level of the sea. The light is of 2,000 candle-power, and the current is produced by a Gramme machine, worked by a stationary surface-condensing steam-engine. All the fittings are double, to prevent unforeseen accidents, and in view of the possibility of a double accident, an oil-lamp is always kept in readiness for use. The light is a revolving one, with two white and one red disk succeeding one another at fifteen minutes' interval, and the light is visible at about 35 miles distance.

AN "occasional contributor" of the Liverpool *Post* has discovered that the "sovereign remedy" for the ills of a grinding gas monopoly is to use lamps and oil. Oil, he says, is cheaper, cleaner, more convenient, better qual-

ity, more independent, and risks about equal. He speaks of the "excellent and exquisite lamps," of "designs and finish infinitely more chaste and artistic," which "admit of and harmonize with everything that is most chaste, classical, and delicate in art. Gas-fittings must always partake more or less of the character of a kitchen-grate, dirty and smoky, of possible use, but inevitable ugliness." The Liverpool Gas Company would do well to appease this writer by presenting him with a gilt-edged gas-meter.

Iron Age tells an amusing incident in connection with the laying of the underground cables in Washington. The receptacle for the wires had been laid for four squares and covered over very carefully, when it was discovered that no wires had been placed in the receptacle, and the whole thing had to be taken up. As a companion piece, a Washington telegraph manager tells of a similar incident which happened in London many years ago. One of the lateral wires connecting with an underground cable had been drawn out for repairs without attaching a leading line to it by which it could be drawn through again. In this case the remedy consisted in fastening a fine steel wire to a large rat and setting him at liberty in the pipe. A ferret was started in after the rat, and the latter ran the entire length of the pipe, bringing the wire with him.

THE Edison system of incandescent-lighting seems to be doing very well in Milan. A central station was established in 1882, and the machinery was soon after increased, so as to make in all six dynamos and five boilers. The Marzoni theatre is lighted by about 400 incandescent-lamps, and the lighting of the large La Scala theatre, which the *Electrician* considers the largest permanent installation in the world, is thus described in that journal:

"The total number of lamps is nearly 2,500, distributed as follows: The stage, which is the largest in the world, requires for its illumination 1,000 lamps; the auditorium and orchestra, 400; vestibule, corridors, foyer, and boxes, 500; the remaining 600 are distributed among the offices, dressing-rooms, and the different stage service-apartments. The stage-lights and those of the grand chandelier are controlled by sixteen regulators. The regulators are distributed as follows: Eight for the overhead traverses, three for the side-lights, two for the foot-lights, and three for the chandelier. The lights supplied through these sixteen regulators can be manipulated separately or simultaneously by means of a common shaft carrying level-gears, which engage with gears on the separate switches. In all, 1,316 lamps are controlled by regulators, all of type A (16 candles). The grand chandelier alone contains 344 lamps, divided among three circuits, each circuit having its own regulator. To provide color effects, the traverses, foot-lights, and side-lights, are provided with blue and red glass globes, making it possible to instantly change from blue to red or white. The regulators are grouped in a room upon the stage, situated so as to command a good view, and from this regulator-room all of the stage circuits are under full control. All the lamps in the theatre, to the number of 2,500, are supplied from four services branching from the general underground network of the central-station system, the theatre itself being situated some 450 metres from the central station. The underground conductors of the district traverse the principal streets in the vicinity of the Piazza del Duomo, and they have at the present time a total length of nearly five kilometres. The most distant consumer is situated about 500 metres from the station. The total number of lamps now being supplied from the station is about 3,500. The contracts with consumers are made at a variable price per unit, depending upon the consumption. The charge is made up of two parts, a constant for each lamp installed corresponding to the interest on investment, depreciation, etc., and a variable charge per lamp per hour, corresponding to the cost of coal, attendance, etc. Upon this basis, the large consumers have the light at a price equal to or even less than the cost of gas, while the small consumers, who use the current but a small number of hours per day, pay from 10 to 20 per cent. more than the cost of gas."

Notes.

CONSTRUCTION.

THE NEW YORK AQUEDUCT COMMISSIONERS have received from the engineers the forms for the plans and specifications for the contracts on the new aqueduct within the city limits.

BAY CITY, MICH.—A. Harvey & Son, Detroit, have received the contract, at \$4,500, for the steam-heating of the new public school just completed, after plans by Architects Pratt & Co.

ORCHARD LAKE, MICH.—The Detroit Metal and Heating Works has received the contracts, at \$2,500, for the steam-heating of the new military academy.

BIDS were opened September 5, for the drainage of the Buffalo State Asylum for the Insane as follows, Charles E. Williams as the lowest bidder receiving the contract: Charles Dark & Sons, \$22,865.45; John O. Smith, \$15,428.38; Peter G. Straub, \$20,212.30; Charles E. Williams, \$18,151.65; John Druar, \$33,717.70; George B. Allen, \$22,872.31.

PROPOSALS were opened on September 1 for repairs to several small streets, and for the construction of two sewers, one on Eighth Street, 2'4" x 3'6", from Cumberland to Huntingdon Streets, and the bidders were Wm. H. Yoast at \$2.42 per foot and \$25 per manhole; Thomas McCann, at \$2.32 per foot and \$25 per manhole; H. C. Eyre at \$2.73 per foot; T. P. Smart, \$2.57 per foot, \$19 per manhole, and \$150 per wellhole; and John Scott bid \$2.85 per foot and \$23 each manhole. For a 2' x 3' sewer on Master Street from Twenty-fourth to Twenty-fifth Streets, and on Twenty-fifth Street from Master Street to Jefferson Street, and on Wright Street from Twenty-fifth Street westward, and the bidders were B. McNichol at \$2.49 per foot, \$24 per manhole and \$100 per wellhole; M. C. Hong \$2.23, \$23, \$150; H. C. Eyre, \$2.37, \$27, \$97; John Noonan, \$2.70, \$25; Thomas McCann, \$2.40, \$27, \$100. The contract in each case was awarded to the lowest bidder.

THE Holly Water-Works Company has entered into a contract with the town of Ashland, Minn., to complete a system of water-works, at a cost of \$65,000.

UTICA, N. Y.—The Water-Works Company proposes to extend mains at a cost of \$75,000, if the city will pay five per cent. annually, and to reduce the interest paid by the city on capital already expended on extensions from seven to six per cent.

WABASH, IND.—The Wabash Hydraulic Company has been organized to improve the Wabash and Erie Canal, between Wabash and La Gro.

JACKSON, MICH.—This city has appropriated \$50,000 for new water-mains and pumping-machinery. Officials have visited the East to examine various systems. Bids for machinery and boilers have been put in by Henry R. Worthington, New York; Gordon & Maxwell, Hamilton, O.; Holly Manufacturing Co., Lockport, N. Y.; Knowles Steam-Pump Works, New York; Southwalk Foundry and Machine Co., Philadelphia; George F. Blake Manufacturing Co., Boston. Figures and decision not yet given.

CAMDEN, N. J.—Charles Johnson's bid of \$18,000 for changing the partly-built jail building into a court-house has been accepted.

SAN FRANCISCO, CAL.—The construction of water-works in Golden Gate Park, for which \$28,000 was lately appropriated, has been checked by the recall of Major W. A. Jones, of General Pope's staff, who had the matter in charge, to Washington. At present the city pays \$1,100 per month to the Spring Water-Works for irrigation.

GOVERNMENT WORK.

THE Merritt Wrecking Company has the contract for raising the U. S. Steamer Tallapoosa; price \$35,000, vessel delivered at the Brooklyn, N. Y., Navy Yard.

RIVER AND HARBOR IMPROVEMENTS.—Buffalo Bayou, Brazos River, Pass Cavallo, and Brazos Santiago, Tex.: Buffalo Bayou—For removing 1,000 stumps and logs, and dredging 50,000 cubic yards, John J. Atkinson, \$15,000; Rittenhouse Moore, \$14,200; W. A. Junker, \$16,000; contract awarded to Rittenhouse Moore. Mouth of Brazos River—Furnishing 1,600 cubic yards of brush and 700 tons of ballast, Frederick A. Brock, \$6,575; R. Kanters & Sons, \$7,978; A. M. Shannon & Co., \$8,300; Rittenhouse Moore, \$6,800; contract awarded to Fred. A. Brock. Pass Cavallo—Furnishing 9,000 cubic yards of brush and 2,000 tons of ballast, James E. Slaughter, \$40,640; R. Kanters & Sons, \$44,800; A. M. Shannon & Co., \$36,400; Rittenhouse Moore, \$37,550; contract awarded to A. M. Shannon

& Co. Improving Brazos Harbor—Furnish 6,000 cubic yards of brush and 1,500 tons of ballast, James E. Slaughter, \$23,925; R. Kanters & Sons, \$31,500; A. M. Shannon & Co., \$28,125; Rittenhouse Moore, \$22,125; contract awarded to Rittenhouse Moore.

DREDGING Saginaw River above Bay City, Mich., opened August 25: Carlin, Stickney & Cram, East Saginaw, Mich., 27½c. per cu. yd.; Chicago Dredging & Dock Company, Chicago, Ill., 32c.; Fitzsimmons & Connell, Chicago, Ill., 35c.; James Rooney, Toledo, O., 37c.; Louis P. Smith and James A. Smith, Cleveland, O., 38c.; Castle Sutherland, East Saginaw, Mich., 60c.; contract awarded to Carlin, Stickney & Cram.

DREDGING Fairport Harbor, Ohio, 15,000 cubic yards of mud, clay, sand, etc.: Jesse Sims, Cleveland, O., 35c. per cubic yard; L. P. & J. A. Smith, Cleveland, O., 38½c. per cubic yard. Price is considered too high, and new bids will be advertised for.

REMOVING ledge of solid rock in Detroit River, opened August 25: Carlin, Stickney & Cram, East Saginaw, Mich., solid rock \$5.40 per cubic yard, loose rock \$1 per cubic yard; Charles F. Dunbar, Buffalo, N. Y., solid \$4, loose 25c.; Charles E. Williams, Buffalo, solid \$6.49, loose \$5; John Hickler, Buffalo, solid \$7, loose \$4.50; Edwin H. French, Fulton, N. Y., solid \$7.75, loose \$7.75; Chicago Dredging & Dock Co., Chicago, solid \$8.50, loose \$8.50; Fitzsimmons & Connell, Chicago, solid \$8.70, loose \$8.70; George W. Townsend, Boston, Mass., solid \$7.40, loose \$7; contract awarded to Carlin, Stickney & Cram.

REPAIRS to piers at mouth of Black River, O., opened August 26: Daniel M. Averill, Cleveland, O., \$6,981.57; Charles A. Sturdevant, Lorain, O., \$6,096.69; John Stang, Lorain, O., \$6,216.90; L. P. & J. A. Smith, Cleveland, O., \$6,431.67; the contract has been awarded to John Stang.

HARBOR REFUGE, SAND BEACH, MICH.—Timber and plank—Brooks, Joslyn & Co., Port Huron, Mich., white pine timber and plank, per M., b. m., \$16.50; Henry Howard & Co., Patterson, Mich., lot 1, \$24, lot 2 \$22, and lot 3 \$20; awarded to Brooks, Joslyn & Co. Iron bolts, plates, and spikes—William H. McCurdy, Cleveland, O., \$2,536.64; Condit, Fuller & Co., Cleveland, O., \$2,555.68; Michigan Bolt & Nut Works, Detroit, \$2,622.57; Ducharme, Fletcher & Co., Detroit, \$2,645.88; Wallace M. Patterson, Cleveland, O., \$2,673.43; Frank Wilson, Cleveland, O., \$2,696.02; Ajax Forge Co., Chicago, Ill., \$3,186.92; awarded to W. H. McCurdy & Co. Dredge, tug, and two dump-scows—George Talbot, Buffalo, N. Y., \$7.90 per hour; Louis P. Smith and James A. Smith, Cleveland, O., \$8.40; John Hickler, Buffalo, N. Y., \$8.49; James Rooney, Toledo, \$10; J. P. Clark, Springfield, Mich., \$18; Chicago Dredging & Dock Co., Chicago, \$18.50; Calvin Currie, Algonac, Mich., \$390 per month; Henry G. Blanchard, Detroit, Mich., \$450; John W. Averill, Jr., & Co., Cleveland, O., \$567; Louis P. & James A. Smith, Cleveland, O., \$1,040; awarded to Calvin Currie for tug, and to George Talbot for dredge, tug, and scows.

PIER EXTENSION, Ontonagon and Grand Marais Harbors, Mich.: Ontonagon—John H. Gillett, Marquette, Mich., \$13,799; Jael Rich, Innean, Mich., \$19,009.50; Horation N. Smith, Milwaukee, Wis., \$13,884. Materials: 17,500 lineal feet of timber, 12x18 and 12x12; 3,000 lineal feet hemlock timber, 12x18 and 12x12; 37,000 feet b. m. pine plank, 600 cords of stone, 20,500 pounds of drift-bolts, 1,500 pounds of screw-bolts, and 2,100 pounds of spikes. Grand Marais—John H. Gillett, \$31,831; Castle Sutherland, East Saginaw, Mich., \$34,465. Materials: 30,000 lineal feet pine timber, 12x18 and 12x12; 20,300 lineal feet hemlock timber, 12x18 and 12x12; 25,000 feet b. m. pine plank, 1,600 cords of stone, 44,000 pounds of drift-bolts, 9,500 pounds of screw-bolts, and 2,000 pounds of spikes. Both awarded to John H. Gillett.

PIER EXTENSION AT KEWANNA HARBOR, MICH.—Hanson & Scove, Manitowac, Wis., \$11,133.50; Schwarze & Berner, Green Bay, Wis., \$10,284.25; Green Dredging Company, Chicago, Ill., \$12,313.25. The articles and quantities to be furnished for this amount are: 16,250 lineal feet round piles other than white oak; 75,000 feet b. m. Norway sheet-piling; 30,750 feet b. m. white-oak timber; 1,000 lineal feet pine timber 12x12; 1,500 feet pine timber 6x12; 5,000 feet b. m. pine plank; 560 cords of stone; 13,000 pounds screw-bolts and tie-rods; 600 pounds spikes.

PITTSBURG, PA.—The bids for erection of new court-house are: Norcross Bros., \$2,233,200; Booth & Flinn, \$2,409,445.87; Fred Gwinner, \$2,557,300; Butz & Schreiner, \$2,778,107; Hallowell Granite Company, \$2,369,516.40.

POTOMAC RIVER IMPROVEMENTS.—Benson & McNee, who have the contract for dredging the Washington channel, are having an iron dredge built in Philadelphia, and will begin work within three months. The contract for making the embankment and dredging along the reclaimed ground has been given to Mr. Somers.

THE following are abstracts of the proposals received for dredging channel through Maumee Bay, Toledo Harbor, Ohio: The first is for 130,000 cubic yards of mud, clay and sand from channel through Maumee Bay, Lake Erie, the contract for which has been awarded to William E. Rooney, whose bid is for the removal of 65,000 cubic yards instead of 130,000. The abstract is as follows: L. P. and J. A. Smith, Cleveland, Ohio, 20c. per cubic yard. George Talbot, Buffalo, N. Y., 17c. William E. Rooney, Toledo, Ohio, 14½c. George W. Sheldon and Albert D. Buck, Toledo, Ohio, 20c. The second abstract is for the removal of 130,000 cubic yards of mud, clay and sand, etc., through Maumee Bay, Lake Erie, the contract for which has been awarded to Edwin H. French, whose bid is for the removal of 100,000 cubic yards. The abstract of bids is as follows: Fitzsimmons & Connell, Chicago, 26c. per cubic yard. Chicago Dredging and Dock Co., 24½c. Edwin H. French, Fulton, N. Y., 15¾c. Carlin, Stickney & Cram, 19c.

BALTIMORE HARBOR, MD.—Contract for dredging channels awarded to the American Dredging Company of Philadelphia

DAVIS ISLAND DAM.—Abstract of the proposals for iron-work for Davis Island dam, opened at Cincinnati, Ohio, August 26, by Lieutenant-Colonel Merrill, Corps of Engineers: Machinery—30,469 lbs. of wrought-iron, Scaife Foundry and Machine Co., 7½c.; Atlas Works, 9 4-10c.; H. A. Ramsey & Son, 9 9-10c.; William Fisher, 10¾c.; P. W. Reinshagen, 14¾c.; Krieger, Burkhardt & Co., 15c. 91,470 lbs. cast-iron, Scaife Co., 5c.; Atlas Works, 6 8-10c.; Ramsey & Son, 7 9-10c.; Fisher, 7 8-10c.; Reinshagen, 14¾c.; Krieger, Burkhardt & Co., 15c. 792 lbs. of brass, Scaife Co., 11c.; Atlas Works, 27c.; Ramsey & Son, 13¾c.; Fisher, 23c.; Reinshagen, 14¾c.; Krieger, Burkhardt & Co., 20c. 763 lbs. of steel, Scaife Co., 39c.; Atlas Works, 49c.; Ramsey & Son, 49¾c.; Fisher, 56c.; Reinshagen, 14¾c.; Krieger, Burkhardt & Co., 82c. 43 lbs. of leather: Scaife Co., \$2.75; Atlas Works, 90c.; Ramsey & Son, \$2.75; Fisher, 75c.; Reinshagen, 14¾c.; Krieger, Burkhardt & Co., \$1.00. Contract for machinery awarded to Scaife Foundry and Machinery Co. Wrought-iron pipe—13,612 lbs.: Atlas Works, 7c.; Wm. Kirkup & Son, 6c. Contract awarded to Kirkup & Son, 6c. Cast-iron pipe—41,483 lbs.: Atlas Works, 3 4-10c.; R. D. Wood & Co., 2 57-100c.; Queen City Bridge and S. F. Co., 2¾c.; Cincinnati and Newport Iron and Pipe Co., 2 1-5c. The contract has been awarded to the last named bidder. Cast-iron plates—18,406 lbs.: Scaife Co., 2 9-10c.; Atlas Works, 3 4-10c.; Wm. Fisher, 3 5-10c.; Queen City Bridge and S. F. Co., 2¾c.; J. W. Foley & Co., 3¾c. Contract awarded to the Queen City Bridge Co. Bolts, nuts and washers—57,275 lbs.: Atlas Works, 4 2-10c.; Queen City Bridge Co., 3¾c.; Oliver Brothers & Phillips, 3¾c.; Mining & Lubbering, 4c. Contract awarded to Oliver Brothers & Phillips.

POST-OFFICE, ETC., NEW YORK CITY.—Synopsis of bids for four steam mail-elevators, opened September 4, 1884: Whittier Machine Co., \$8,125; Stokes & Parrish, \$8,500; Crane Bros. Mfg. Co., \$7,140; Copeland & Bacon, \$7,965; Joseph Edwards & Co., \$8,850; M. B. Cushing, \$6,200; McCoy Bros. & Co., \$6,600.

CUSTOM-HOUSE AND POST-OFFICE, KNOXVILLE, TENN.—Synopsis of bids for painting, varnishing, and bronzing, opened September 4, 1884: A. H. Linthal, \$2,700; John F. Haupt, \$3,688; Havelly, Williams & Co., \$4,500; John St. Carr, \$3,526.

THE contract for building boiler for the steamer "Bache" has been awarded to C. H. Delamater & Co., on their bid of \$5,100.

DREDGING AND IMPROVING PIERS, AT HURON HARBOR, O.—Synopsis of bids, L. P. & J. A. Smith, Cleveland, O.: 1. 2,443 lineal feet white oak or red elm piles, driven and cut off, per lineal foot, 29c.; 2.

1,332 lineal feet white oak or red elm piles or ties and back-logs, per lineal foot, 24c.; 3. 78,930 feet b. m. white pine timber and plank, including labor, total, \$694.80; 4. 1,620 pounds iron tie-rods, total, \$72.90; 5. 3,809 pounds screws and washer-bolts, per pound, 5c.; 6. 4,150 pounds drift-bolts, 4½c. per pound; 7. 44 cords fascines and brush, \$3 per cord; 8. 155 cords stone (filling), \$5 per cord; 9. 500 cubic yards dredging and removing material, 70c. per cubic yard; 10. 912 pounds wrought spikes, total, \$41.04; entire total of bid, \$6,075.78. John Stang, Lorain, O., bids on the above items as follows: 1, 30c.; 2, 25c.; 3, \$34; 4, total, \$926.40; 5, total, \$64.80; 6, 4c.; 7, 4c.; 9, \$3; 8, \$5; 10, 50c.; 11, total, \$36.48; grand total, \$6,252.56. Contract awarded to L. P. & J. A. Smith.

DREDGING CEDAR HARBOR, ILL.—The only bid was from Green's Dredging Company, O. B. Green, President, at 18c. per cubic yard; 10,000 yards, total, \$1,800. Price considered reasonable, and contract awarded. Bids for extension of pier have been returned to Milwaukee, on account of certain discrepancies.

LUKE CHANNEL, ME.—Synopsis of bids for improvements: Moore & Wright, Portland, Me., 45,000 cubic yards dredging, 45c. cubic yard; Hamilton & Sawyer, Yarmouth, 54c. Both bids are rejected, being considered unreasonably high.

MOOSE-A-BEC BAR, ME.—Synopsis of bids for improvements: Moore & Wright, Portland, Me., 27,000 cubic yards dredging, 48c. per cubic yard; Hamilton & Sawyer, Yarmouth, 56c. Bids rejected, being too high.

PORTLAND HARBOR, ME.—Bids for furnishing 35,000 tons of rubble-stone for improvements in Portland Harbor: Farker & Sylvester, Boston, \$1.14 per ton; William P. Hurley, Rockland, Me., \$1.05; Bodwell Granite Co., Rockland, \$1.28½; John F. Hamilton, Portland, Me., \$1.06; Thomas A. Rowe, Newton Centre, Mass., 88c.; Sargent & Hamilton, Portland, \$1.19; Charles H. Edwards, Boston, \$1.04; Davis Tillson, Rockland, Me., \$1.20. 125 cubic yards of dredging for same—Boynton Bros., Boston, 16½c.; Moore & Wright, Portland, 14c.; Lamartine J. Forbes, Baltimore, 18c.; Hamilton & Sawyer, Yarmouth, 17¼c. Moore & Wright awarded contract.

SACO HARBOR, ME.—Bids for rubble-stone: 1. 8,500 tons, class A; 2. 2,500 tons, class B; 3. 216 cubic feet granite ashler. Sargent & Hamilton, 1, \$1.95; 2, \$1.95; 3, 75c. Curb & Hamilton, Chebeague, Me., 1, \$1.68; 2, \$1.35; 3, 67c. Goodwin & Bragdon, Biddeford, Me., 1, \$1.70; 2, \$1.37; 3, 70c. Charles H. Edwards, Boston, 3, \$1.34. All bids rejected; too excessive.

PORTSMOUTH HARBOR, ME.—Abstract of bids for removing 600 cubic yards ledge rock: Solar S. Andrews, Biddeford, Me., \$24.50 per cubic yard; Thomas A. Rowe, Newton Centre, Mass., \$27.97; Sargent & Hamilton, Portland, \$26.50; Parker & Sylvester, Boston, \$29.75; George W. Townsend, Boston, \$22.10. Mr. Townsend was awarded the contract.

Association News.

BOSTON MASTER PLUMBERS.—The regular meeting of the Boston Association of Master Plumbers was held on the 4th inst. A goodly number was present, but owing to the excessive heat, an early adjournment took place, and but little business was transacted.

THE CHICAGO MASTER PLUMBERS' ASSOCIATION met September 3, Mr. E. Baggot in the chair. Thomas Havey was made chairman of the Legislative Committee, in place of Alderman Sanders, on the ground that the latter was too busy to serve. Mr. Havey thought that some legislation should be secured requiring the use of iron pipe in house-drainage, and, after discussion, he was encouraged to move for such legislation next winter, and so bring Chicago in line with New York. An objection was raised to iron pipe, that, unless coated, it would rust, whereupon somebody jumped up and said it would do that when it was fresh from the hands of the manufacturer, and what was more, often fell to pieces at the start. Others shared in this criticism of some iron pipe manufactured here and elsewhere. A fine photograph in a costly frame was presented to the library, of the late Alex. Raffin, first plumber in Chicago, his son, John T. Raffin, of Clark, Raffin & Co., giving it, and Andrew Young making the presentation speech, speak-

ing of his own apprentice days under the veteran commemorated. Then Mr. Young, as President of the National Plumbers' Association, read a reply to the recently-delivered reply of manufacturers and dealers, regarding the matter of protection. After discussion, a resolution was passed indorsing Mr. Young's action and reply.

BOOKS RECEIVED.

ANNUAL REPORT OF THE HEALTH AND SANITARY CONDITION OF SUNDERLAND. Alfred Edwin Harris, L. R. C. P. & I., Ed., F. C. S., F. R. G. S., Medical Officer of Health and Borough Analyst.

REPORT OF THE HEALTH OFFICER ON ENTERIC FEVER IN THE CITY OF YONKERS, N. Y., to the Board of Health 1884.

REASONS FOR BELIEVING IN THE CONTAGIOUSNESS OF PHTHISIS. By W. H. Webb, M. D. Philadelphia.

REPRINTS FROM REPORTS OF THE MEDICAL DEPARTMENT, London, Eng., for the years 1865, 1866, and 1867. With Preliminary Report by the Medical Officer, 1884.

OFFICIAL PUBLICATIONS OF THE INTERNATIONAL HEALTH EXHIBITION, London, Eng.: Health in the Village, by Henry W. Acland, C. B., F. R. S., illustrated; Healthy Nurseries and Bed-Rooms, including the Lying-in Room, by Mrs. Gladstone; Healthy and Unhealthy Houses in Town and Country, by William Fessie, C. E., F. L. S., F. G. S., etc., with an appendix by Rogers Field, B. A., M. Inst. C. E., illustrated; Healthy Furniture and Decoration, by Robert W. Edis, F. S. A., Architect, illustrated; Healthy Schools, by Charles E. Paget, M. R. C. S.; Health in the Workshop, by James B. Lakeman, Esq., H. M. Senior Metropolitan Inspector of Factories, Home Office; On Ventilation, Warming and Lighting for Domestic Use, by Captain Douglas Galton, C. B., F. R. S., illustrated; Diet in Relation to Health and Work, by A. W. Blyth, M. R. C. S., F. C. S., etc.; On the Principles of Cooking, by Septimus Berdmore; Food and Cookery for Infants and Invalids, by Miss Wood, with preface by W. B. Cheadle, M. D., F. R. C. P.; Alcoholic Drinks, by John L. W. Thudichum, M. D., F. R. C. P. (London), etc.; Water and Water-Supplies, and Unfermented Beverages, by Professor Atfield, Ph. D., F. R. S.; Salt and Other Condiments, by J. J. Manley, M. A.; Legal Obligations in Respect to Dwellings of the Poor, by Harry Duff, M. A., Barrister-at-Law, with a preface by Arthur Cohen, Q. C., M. P.; "Our Duty," or Moral Responsibility of the Individual in Regard to Health, by G. V. Poore, M. D., F. R. C. P.; Infectious Disease and Its Prevention, by Shirley F. Murphy, Medical Officer of Health to St. Pancras; Cleansing Streets and Ways in the Metropolis and Other Large Cities, by William Booth Scott; Fires and Fire-Brigades, by Captain Eyre M. Shaw, C. B., illustrated; Athletics, or Physical Exercise and Recreation, Part I., by Rev. E. Warre, M. A., Eton College, illustrated; Athletics, Part II., by Hon. E. Lyttelton, M. A., and Gerard F. Cobb, M. A.; Dress, and Its Relation to Health and Climate, by E. W. Godwin, F. S. A., illustrated; Accidental Injuries, Their Relief and Immediate Treatment; How to Prevent Accidents becoming more Serious, by James Cantlie, M. A., M. B., F. R. C. S., illustrated; The Ambulance, by Surgeon-Major Evatt, M. D., A. M. D., illustrated; The Influence of Schools of Art on Manufacturing Industry, by John Sparkes.

International Health Exhibition Papers:

ETHICS OF THE SKIN. A Lecture delivered in the Lecture-Room, June 19, 1884. By Malcolm Morris, F. R. C. S., Ed.

THE HISTORY AND RESULTS OF A DISPENSARY FOR SICK CHILDREN THREATENED WITH CHRONIC DISEASE. A Lecture delivered in the Lecture-Room, July 3, 1884. By Dr. J. Gibert (of Havre).

OUR DOMESTIC POISONS. A Lecture delivered in the Lecture-Room, June 30, 1884. By Henry Carr, M. Inst. C. E. With an Appendix on Arsenical Poisoning by Wall-Papers.

HEALTHY HOUSES. A Lecture delivered in the Lecture-Room, June 24, 1884. By T. Pridgin Teale, M. A., F. R. C. S.

THE HISTORY OF ENGLISH DRESS. A Lecture delivered in the Lecture-Room, June 24, 1884. By the Hon. Lewis S. Wingfield.

THE ENGLISH DAIRY. A Lecture delivered in the Lecture-Room, June 16, 1884. By Professor J. P. Sheldon.

PRACTICAL DIETETICS, Especially in Relation to Preserved and Condensed Foods. A Lecture delivered in the Lecture-Room, June 13, 1884. By Professor F. de Chaumont, M. D., F. R. S.

THE ÆSTHETICAL USE OF WINE AND ITS INFLUENCE UPON HEALTH. A Lecture delivered in the Lecture-Room, June 11, 1884. By J. L. W. Thudichum, M. D., F. R. C. P., Lond.

THE MEAT-SUPPLIES OF THIS COUNTRY. Conferences of the International Health Exhibition. London, Eng., June 18, 1884.

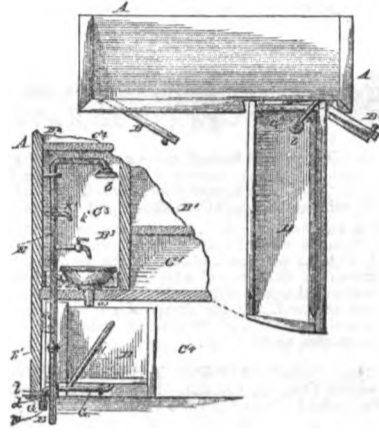
DWELLINGS OF THE POOR. Conferences of the International Health Exhibition. London, Eng., June 4, 5, and 6, 1884.

CATALOGUE OF THE INTERNATIONAL HEALTH EXHIBITION LIBRARY. Division I., Health. London, Eng., 1884. Carl A. Thimm, Librarian.

American Patents.

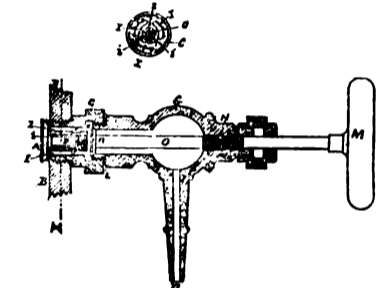
It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

297,081. BATHING APPARATUS. GEROW KOONS, St. Louis, Mo. Filed May 25, 1883. (No model.) Issued April 15, 1884.



Claim.—The combination, with the bath-tub and cabinet, of the supporting-lunge c, the swinging waste-pipe G, and eye I, the swiveled coupling m, the pipe E, and swiveled coupling E', and the shower-jet b, secured to the horizontal portion of the pipe E, substantially as specified.

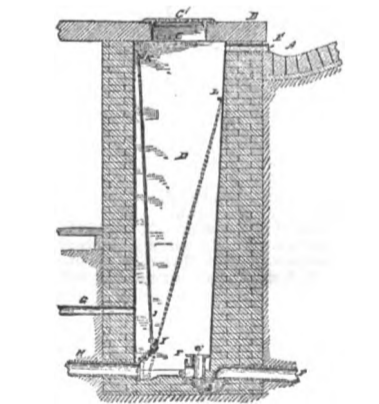
297,669. GAUGE-COCK. WILLIAM CASEY, Algiers, La. Filed July 9, 1883. (No model.) Issued April 29, 1884.



Claim.—In a gauge having two valves, one being placed on the inside of the boiler, the combination of the ports I, cast in shell C of inner valve, A, with the short stem D of the inner valve, A, and the screw N on stem O of the outer valve, R, all substantially as described, and for the purpose specified.

297,848. SEWER. THOMAS L. STARK, Chicago, Ill. Filed December 26, 1883. (No model.) Issued April 29, 1884.

Brief.—A basin or well, into which empties the house-drain and gutter pipes, has a manhole and cover, and overflow-pipe connecting with the street-gutter, and a discharge-pipe emptying into the main sewer. A valve applied to the mouth of the house-drain pipe is operated by a rod secured in raised or lowered position.



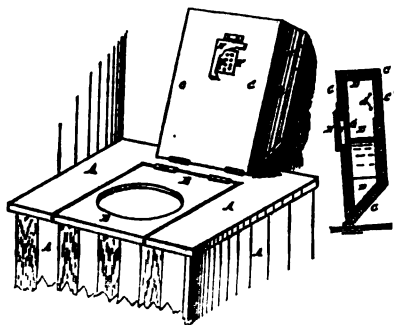
Claim.—1. The combination of the well, hole, or basin, the house-pipe H, entering the said basin, the pipe F, entering the said basin and communicating with the main sewer, a valve or door applied to the discharging end of the pipe H, and means for opening and closing the said valve, substantially as and for the purposes specified.

2. The combination of the basin D, the pipes H and F, the valve I, the rod J, and means for retaining it in its raised and lowered positions, the pipe or duct E, the hole or opening C and its cover, and the roof-gutter pipe, all arranged, substantially as shown and described, with relation to each other, for the purposes set forth.

298,091. DEODORIZING AND ANTISEPTIC WATER-CLOSET COVER. FREDERICK H. HUBBARD, Brooklyn, N. Y. Filed January 14, 1884. (No model.) Issued May 6, 1884.

Claim.—1. The combination, with a hinged water-closet cover made in box form, of a non-corrosive vessel arranged in said cover and provided with a number of fine perforations in its bottom, substantially as herein shown and described, and for the purpose set forth.

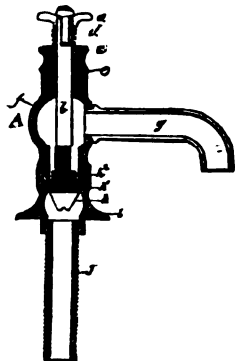
2. The combination, with the hinged hollow water-closet cover C, having an opening, F, in its lower surface, of the non-corrosive vessel D, arranged in said cover and provided with the fine perforations G in its bottom over the opening of the cover, substantially as herein shown and described.
3. The combination, with the hinged hollow cover C, provided with the opening F in its lower surface, and



the vessel D, arranged in said cover and provided with perforations G over the opening of the cover, of the flap H, hinged to the cover, near the forward edge of its opening, substantially as herein shown and described.

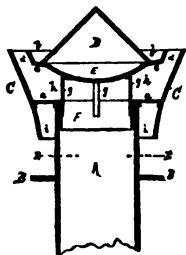
4. In a water-closet cover, the non-corrosive interior vessel, D, made substantially as herein shown and described, with its rear part closed at the top, and fine perforations in its bottom, whereby the liquid contents of the said vessel will be allowed to drip when the said cover is closed, and the dripping will be prevented and the said contents kept from being spilled when the cover is opened, as set forth.

297,691. SELF-CLOSING TAP. FRANCIS HYDE, Toronto, Ontario, Canada. Filed March 12, 1883. (No model.) Issued April 29, 1884.



Claim.—In a faucet, the valve-body A and threaded stem J, combined with the valve-stem B, triangular in cross-section and carrying the upwardly-seating valve A, valve-seat A', and metallic flanged washer A'', the whole arranged substantially as set forth.

297,972. VENTILATING FLUE-CAP. HENRY LAWRENCE DAY, Minneapolis, Minn. Filed September 18, 1883. (No model.) Issued May 6, 1884.



- Claim.*—1. The combination of the flue A, outwardly-flaring shield C, dome D, and convex bottom E, substantially as and for the purpose herein specified.
2. The combination of the flue A, deflecting-ring B, flaring shield C, dome D, and convex bottom E, substantially as and for the purpose herein specified.
3. The combination of the flue A, shield C, and dome D, having the lower upturned edge, E, and convex bottom E, substantially as set forth.
4. The combination of the flue A, shield C, dome D, standards G, and ring F, substantially as described.
5. The combination of the flue A, deflecting-ring B, flaring shield C, dome D, having the upturned edge E, and the bottom E, substantially as and for the purpose herein specified.

297,603. APPARATUS FOR IMPROVING THE FIRE-TEST OF PETROLEUM AND FOR BLEACHING OTHER OILS. JOHN B. HUSTON, Cleveland, Ohio. Filed June 9, 1883. (No model.) Issued April 29, 1884.

297,620. AUTOMATIC FIRE-ESCAPE. GEORGE W. MURPHEY and FRANK P. MURPHEY, Kenney, assignors of two-fifths to Park B. Murphey and Charles M. Murphey, both of Harristown, Ill. Filed June 14, 1883. (No model.) Issued April 29, 1884.

297,630. SMOKE-PREVENTING FURNACE. GEORGE PLAYFORD and GEORGE RICHARD SWAINE, Cleveland, Ohio; said Swaine assignor to Charles F. Alexander, same place. Filed June 29, 1883. (No model.) Issued April 29, 1884.

297,649. WATER-TUBE STEAM-GENERATOR. CHARLES WARD, Charleston, W. Va. Filed March 4, 1880. Renewed November 2, 1883. (No model.) Issued April 29, 1884.

297,707. VENTILATOR. CONRAD MULLER, Hamburg, Germany. Filed May 28, 1883. (No model.) Patented in Germany September 28, 1882, No. 22,015. Issued April 29, 1884.

297,710. FIRE-ESCAPE. MATTHEW C. O'CONNOR, New Haven, Conn. Filed May 23, 1883. (No model.) Issued April 29, 1884.

297,780. FIRE-RESISTING WEATHER-BOARDING. PETER TOGLIO, Charleston, S. C. Filed February 5, 1884. (No model.) Issued April 29, 1884.

297,785. SPRING FOR STEAM AND OTHER PRESSURE-GAUGES. EDWIN A. WOOD, Utica, N. Y. Filed January 16, 1884. (Model.) Issued April 29, 1884.

297,787. ILLUMINATING-BURNER. CHARLES CLAMOND, Paris, France. Filed January 8, 1884. (No model.) Patented in France May 20, 1880, No. 136,771; in Belgium May 28, 1880, No. 61,763; in Italy June 17, 1881, No. 10,600; and in England June 20, 1883, No. 3,062. Issued April 29, 1884.

297,788. FURNACE. JEAN PIERRE COTIART, Havana, Cuba. Filed April 10, 1883. (No model.) Patented in England February 3, 1883, No. 590, and in France February 16, 1883, No. 141,458. Issued April 29, 1884.

297,778. GAS-PUMP. WILLIAM J. FERGUSON, Baltimore, Md., assignor of two-thirds to J. Olney Norris and Isaac T. Norris, both of same place. Filed November 1, 1883. (No model.) Issued April 29, 1884.

297,790. FIRE-ESCAPE LADDER. HORACE P. GRISWOLD, Providence, R. I. Filed January 2, 1884. (No model.) Issued April 29, 1884.

297,791. CONCRETE COMPOUND FOR PAVING STREETS, WALKS, ETC. LEVI HAAS, Chester, Pa. Filed December 21, 1883. (No specimens.) Issued April 29, 1884.

Claim.—1. A concrete compound composed of furnace-slag, gravel, Portland cement, metallic screenings, obtained by washing ores, glass cinders, wood and coal ashes, Trinidad asphaltum, and coal-tar pitch in the proportions substantially as described.

2. A concrete compound for the manufacture of tile and ornamental brick, composed of furnace-slag, gravel, Portland cement, metallic screenings obtained by washing ores, glass cinders, wood and coal ashes, Trinidad asphaltum, and coal-tar pitch, and refuse slate for coloring-matter, substantially as described.

297,808. ILLUMINATING-TILE. JACOB JACOBSON, New York, N. Y. Filed February 16, 1884. (No model.) Issued April 29, 1884.

297,808. FURNACE-DOOR. LUMAN F. JOHNSON, Cleveland, O. Filed December 3, 1883. (No model.) Issued April 29, 1884.

297,820. GAS-ELECTRIC LAMP. JOHAN HERN LODER, Brussels, Belgium. Filed January 17, 1883. (No model.) Issued April 29, 1884. Patented in England December 8, 1882, No. 5,861; in Belgium, December 9, 1882, No. 43,512; in France December 11, 1882, No. 140,314; and in Germany December 16, 1882, No. 120,725.

297,835. VENTILATING RAILROAD-CARS. JAMES M. PALMER, Cambridge, Mass. Filed December 11, 1883. (No model.) Issued April 29, 1884.

297,843. FIRE-ESCAPE. CHARLES INGLISS PITTMAN, Halifax, Nova Scotia, Canada. Filed July 19, 1883. (No model.) Issued April 29, 1884.

297,845. SMOKE-BURNING ATTACHMENT FOR FURNACES. WILLIAM A. PORTER, Alliance, and WILLIAM HESTON, Mount Union, O. Filed December 29, 1883. (No model.) Issued April 29, 1884.

297,857. FIRE-ESCAPE. GEORGE SINFIELD, Portland, Ore. Filed April 6, 1883. (No model.) Issued April 29, 1884.

297,879. COMBINED ELECTRIC-LAMP LIGHTING AND EXTINGUISHING DEVICE. HENRY VAN HOVENBERGH, Elizabeth, N. J. Filed October 6, 1883. (No model.) Issued April 29, 1884.

297,880. HOSE-COUPLING. GARRITT M. VAN RIVER and JAMES O. ST. CLAIR, Republic, Mich. Filed October 9, 1883. (No model.) Issued April 29, 1884.

297,888. FIRE-ESCAPE. DAVID WARE and CHARLES W. RICHMAN, Philadelphia, Pa. Filed January 31, 1884. (No model.) Issued April 29, 1884.

297,922. WATER-METER. ALPHONSE FRAGER, Paris, France, assignor of one-half to Société Michel et Cie, same place. Filed February 16, 1884. (No model.) Issued April 29, 1884. Patented in France November 9, 1882, No. 152,009.

297,928. GAUGE-COCK. LOUIS B. FULTON, Pittsburgh, Pa. Filed November 21, 1883. (No model.) Issued April 29, 1884.

297,969. CONDENSER FOR STEAM AND SMOKE. JAMES M. CARVER, Grand Rapids, Mich., assignor of one-half to Jeremiah W. Boynton, same place. Filed September 7, 1883. (No model.) Issued May 6, 1884.

297,971. MANUFACTURE OF ARTIFICIAL STONE AND MARBLE. HENRY ADOLPHUS DANIELS, Yonkers, N. Y. Filed March 1, 1884. (Specimens.) Issued May 6, 1884.

Claim.—1. An artificial stone or marble composed of lime of Tiel, lime, Keen's cement, Martin's or other cements, marble-dust, and calcined or other plaster, united and solidified by mixing therewith a chemical solution formed of starch, gum-arabic, caoutchouc, white vitriol, glue, muriate of soda, soluble glass, and pearlash, with or without nut-gall, substantially as and for the purposes set forth.

2. The herein-described liquid compound, consisting of starch, gum-arabic, caoutchouc, white vitriol, glue, muriate of soda, soluble glass, and pearlash, with or without nut-gall, substantially in the proportions named, for the purpose of producing the crystallization of the artificial stone and marble, as described.

297,988. APPARATUS FOR MANUFACTURING ILLUMINATING-GAS. ARTHUR O. GRANGER, Philadelphia, Pa., assignor to A. O. Granger, same place. Filed June 25, 1883. (No model.) Issued May 6, 1884.

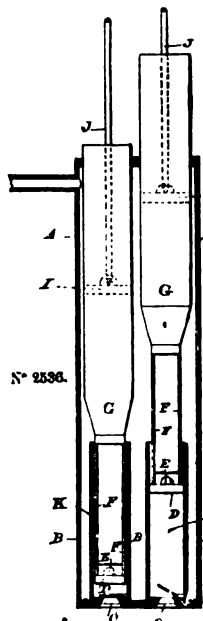
English Patents.

2,601. IMPROVEMENTS IN MEANS OR APPARATUS OF RESPIRATION FOR VENTILATING DWELLINGS AND CARRIAGES, and in what manner the same is to be performed.



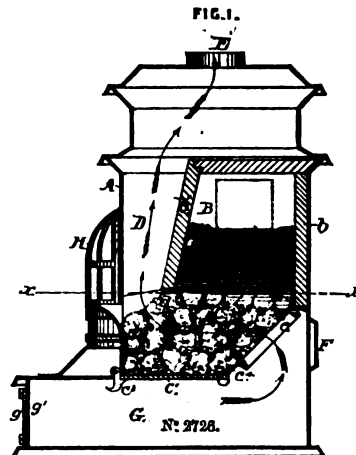
HERMANN OTTO ALBERT EMIL GRUENBAUM, dentist, of No. 10 Upper William Street, Angel Lane, Stratford, in the county of Essex. Complete Spec. February 2, 1884. (Price 4d.)

2,536. IMPROVEMENTS IN PUMPS, and in what manner the same is to be performed.



HERBERT JOHN ALLISON, of Chancery Lane, in the County of Middlesex. Com. spec. February 1, 1884. (Price 4d.)

2,726. IMPROVEMENTS IN STOVES FOR BURNING BITUMINOUS COAL, and in what manner the same is to be performed.



HERBERT JOHN ALLISON, of the firm of Allison Brothers, Chancery Lane, London, in the county of Middlesex. Complete spec. February 5, 1884. (Price 6d.)

8,809. IMPROVEMENTS IN APPARATUS FOR PREVENTING WASTE OF WATER IN WATER-CLOSETS, URINALS, AND OTHER PLACES WHERE A MEASURED QUANTITY OF WATER IS REQUIRED TO BE DELIVERED AT EACH OPERATION.

ALFRED TYLOR, of 2 Newgate Street, in the City of London, brass-founder. Prov. spec. July 4, 1883. (Price 2d.)

8,888. AN APPARATUS FOR PURIFYING AND CLARIFYING COAL-GAS.

FREDERICK ALEXANDER WALKER, 16 Park Place, Milton, next Gravesend, in the county of Kent. Complete spec. February 25, 1884. (Price 4d.)

8,914. IMPROVEMENTS IN PURIFYING WATER AND SEWAGE.

This invention relates to the purification of water and sewage by precipitating and extracting the lime-iron, and solids therefrom by the use of phosphate of soda. ARTHUR GOLDTHORPE of the firm of James Goldthorpe & Co., of Wakefield, in the county of York. Prov. spec. August 13, 1883. (Price 2d.)

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; bs dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

Norfolk st, n w cor Hester st, 5-story br ten; cost, \$15,000; o, Jacob Gottlieb; a, Charles Rentz.

33d st, s s, 200 e 1st av, 6-story br warehouse; cost, \$25,000; o, Fred C. Linder; a, Schwarzmann & Buchman; b, Robinson & Wallace.

442-44 W 54th st, 2 5-story br tens; cost, ea \$15,000; o, Louis Reichardt; a, Julius Kastner.

766 8th av, 5-story br flat and st; cost, \$29,000; o, Richard Mock; a, C. F. Ridder, Jr.

13th av, s e cor 14th st, 2 6-story br storage warehouses; cost, ea \$42,000; o, H. K. Thurber & Son; a, and b, J. G. McMurray.

1st av, e s, 27 n 83d st, 3 5-story br tens and sts; cost, ea \$16,500; o, Philip Braender; a, John Brandt.

83d st, n s, 85 e 1st av, 5-story br ten; cost, \$12,500; o and a, same as last.

1st av, n e cor 83d st, 5-story br ten and st; cost, \$20,000; o and a, same as last.

4th av, s e cor 113th st, 5-story br st and apart house; cost, \$24,000; o, William Henderson; a, J. C. Burne.

113th st, s s, 26 e 4th av, 5-story br st and apart house; cost, \$21,000; o, etc., same as last.

113th st, s s, 52 e 4th av, 5-story br apart houses; cost, \$20,000; o, a and b, same as last.

113th st, s s, 130 w 4th av, 4 5-story br st front tens; cost, ea \$15,000; o, Simon Haberman; a, Henry J. Dudley.

511-13-15-17 W 61st st, 4 5-story br tens; cost, ea \$15,000; o, Louis Reichardt; a, Julius Kastner.

60th st, s s, 100 w 9th av, 5 4-story br st front dwells; total cost, \$30,000; o, Chas. L. Guilleaume; b, to be done by day's work.

8th av, e s, 103.10 n 122d st, 3 4-story br tens; cost, ea \$17,000; o, Lorenz Weiher; a, J. F. Burrows.

131st st, s s, 80 e Madison av, 2 5-story br st front tens; cost, ea \$16,000; o, Frank M. Clemens; a, John Brandt.

81st st, n s, 331.6 e 1st av, 4 5-story br tens, 25x82; cost, each, \$16,000; o, Mathias H. Schneider; a, J. Kastner.

118th st, s s, 655 e Av A, 3-story br office bldg, 50x54.8; cost, \$20,000; o, R. H. Wolf & Co., limited; a, Schwarzman & Buchman.

5th av, n e cor 90th st, 1-story br riding school, 62x146; cost, \$20,000; o, Carl Antony; a, J. D. Schroff.

66th st, s s, 325 e 10th av, 5-story br ten, 25x90; cost, \$18,000; o, Margaret Shannon; b, Thos. Shannon.

BROOKLYN.

Columbia Heights, e s, 75 n Orange st, 5-story br st apart house; cost, about \$23,000; o, James Lane; a, Samuel Curtiss.

Kosciusko pl, s s, 100 e of Broadway, 3 3-story br tens; cost, ea, \$5,000; o and a, Ferdinand Wiegand; b, Ernst Loersch and John Rueger.

30th st, n s, 150 e 3d av, 5 3-story fr tens, 25x48; cost ea, \$3,000; o and b, J. Mahoney; a, W. H. Wirth.

Nostrand av, n e cor Clifton pl, 4-story br st and flats, 20x60; cost, \$12,000; o, A. C. Bosshard; a, Chas. Werner; b, M. Ryan.

North 9th st, s s, 175 w 4th st, 2 4-story fr (br filled) tens, 25x55; cost ea, \$5,800; o, Louis Schafer and Franz Roos; a, L. Schafer; b, Gately & Smith and John Fallon.

Buffalo av, e s, 120 s Herkimer st, 2 2-story and bmt fr (br filled) dwells, 18.9x36; cost, \$—; o, S. A. Hocking and W. Brockway; a, Amzi Hill.

Herkimer st, n s, 138 e Nostrand av, 2 3-story br dwells, 20x62; cost ea, \$11,000; o and b, Andrew Miller; a, A. Hill.

Prospect av, s s, 100 w 7th av, nine 2-story fr dwells; cost ea, \$2,000; o, a and b, Grogan & Baulch.

Clymer st, n s, 100 e Kent av, 5-story stone factory, 126x50; cost, \$25,000; o, F. Cowperthwait; a, W. H. Gaylor; b, Thomas Gibbons.

Manhattan av, w s, 325 s Meserole st, 2 4-story br sts and tens; cost for both, \$14,450; o, Mary Marrett; a, Fr. Weber; b, James Rooney and Thomas Kepple.

South 5th st, s e cor 9th st, 1 and 2-story church and Sunday-school rooms, 63.2x136.1; cost, \$65,000; o, St. Paul's E. L. Church; a, J. C. Cady & Co.; b, W. T. Lamb, Jr., and Bernard Gallagher.

River front, 106 s Joralemon st, 6-story br warehouse, 71x200; cost, \$43,500; o, F. Woodruff; a and b, T. Stone.

Monroe st, n s, 400 w Ralph av, 4 2-story and bmt br dwells; cost ea, \$4,700; o, A. Peck; a and carp, F. Marryott; m, T. Miller.

Humboldt st, n w cor Seigel st, 4-story br factory, 150x50; cost, \$15,000; o, Martin Worn; a, J. Platte; b, J. Auer.

Franklin av, e s, 75 s Gates av, 2 3-story and bmt; dwells, 17x54; cost ea, \$7,500; o and b, J. B. Alexander; a, A. Hill.

ALTERATIONS, NEW YORK.

3 Rutherford pl, 4-story br extn, 19.8x11.6, interior alterations; cost, \$6,000; o, A. H. Flanders; a, H. Kreitler.

134th st, s s, 150 e Lincoln av, raise one story; cost, \$5,000; o, the New York Wood Turning Co.; a and b, Wm. J. Merritt.

ALTERATIONS, BROOKLYN.

233 Court st, new br front and add one story, also 4-story br extn, 19.4x28; cost, \$6,850; o, A. Lutiger.

BOSTON, MASS.—203 W 3d st, fr dwell; o and b, J. Swanton.

99 Purchase st, br mercantile bldg; o, J. H. Austin; a, S. Weisbein; b, R. R. Moyers.

Dule st, cor Regent, br family hotel; o, and b, M. C. Grant; a, S. Weisbein.

309 Commonwealth av, br dwell; o, J. F. Andrews; b, Norcross Bros.

CHICAGO, ILL.—116-118 Dearborn st, stone and br store and office bldg; cost, \$60,000; o, Lewis Hanson; a, 860 W Van Buren st, br st and flats; cost, \$7,000; o, P. O'Donnell; a, — Wilson; b, Dunphy & Wake-man.

524 Halsted st, br engine house; cost, \$10,000; o and b, the city; a, Alex. Kirkland.

10 S Curtis st, br engine house; cost, \$10,000; o and b, the city; a, Alex. Kirkland.

1313 Indiana av, br dwell; cost, \$9,000; o, J. W. McGennis; a, F. S. Chamley; b, J. Griffiths.

(Continued on page 352.)

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WARNING!

IN our issue of September 4 we warned the public and our friends against a swindler calling himself John J. King, who has been collecting money on forged checks. When last heard from this man had victimized two firms in Montreal. He was accompanied by a man claiming to represent Kelly & Brother, of Chicago. The unwillingness of parties who have been swindled to promptly acquaint the police authorities with the fact has granted immunity to the rascals thus far. The checks hitherto drawn have been on the Park Bank of this city, and signed "THE SANITARY ENGINEER, Gibson, Publisher." The man's method has been to call upon the friends of this paper, talk about its affairs, and during such conversations the individual claiming to represent the Messrs. Kelly happens in and greets him as an acquaintance. The so-called Mr. Kelly solicits orders for brass-work, and the conversation of the two indicates some familiarity with the business of THE SANITARY ENGINEER's advertisers, thus deceiving our friends. We learn at the Park Bank that quite a number of these checks have been presented, though only three of the firms victimized have communicated with us. It may be well to state that Messrs. Kelly & Brother have had no representative in Canada. We would feel greatly obliged if our contemporaries will give what publicity they can to this matter, in the hope that the community may soon be rid of these fellows.

THE AMERICAN ASSOCIATION.

THE recent meeting of the American Association for the Advancement of Science must be pronounced a success in spite of the intense heat. The able address of the retiring president, Professor C. A. Young, the character of the vice-presidents, the presence of the foreign visitors, made it an occasion to be remembered. It is true that some of the addresses—such as that of Professor Cope, for example, involving a theory of the origin of animals and plants—contained little which could appeal to men of a practical turn of mind. In the case, however, of most of the vice-presidential addresses, even if they were not wholly intelligible, one could still appreciate the fact of their value. Such, for instance, was the address of Professor Trowbridge on "What is Electricity?" The question was not answered, but our ignorance was exposed, as well as the necessity for better theoretical conceptions, which can be reached only by purely scientific research.

After all, it is not the general public for whose sake the annual meetings are held, and if the local committee and the citizens of Philadelphia (and the press) are not made essentially wiser, we cannot doubt the beneficial effect upon the scientists themselves, coming together from East and West and North and South for social fellowship and friendly discussion.

The excursions to the Rocky Mountains and other localities prevented as large an attendance of members of the British Association as might be desired, but those who did visit Philadelphia will carry away pleasant impressions of everything but the climate, and as one result of the meeting we may hope for increased sympathy and co-operation between the scientific men of the two countries.

POLLUTION OF BOSTON AND MARLBORO WATER-SUPPLY.

WE notice by the Boston papers that the city authorities have had their attention called to the possible pollution of the Sudbury River, the source of their water-supply, by the sewage of the town of Marlboro, and the fact is undisputed that this village drains all its filth into a small stream that is tributary to the Sudbury. The case is a fair sample of what is likely to occur in many other places where a public water-supply is taken from a water-shed which, though not populous at first, may rapidly become so to a degree which involves serious risks. Marlboro is a thriving village of nearly 10,000 inhabitants, among the hills of Worcester County, though actually in Middlesex. It has grown up from very small beginnings during the past twenty-five years through the manufacture of boots and shoes. Within the past two years the wants of the place gave rise to the construction of a public water-works, at the cost of the town, taking the water from a pond within its own limits, and pumping it to a small reservoir on a neighboring hill, from which the whole village is supplied. The sewage of the population, which, before this improvement, had been insignificant in volume and had been disposed of by the ordinary porous cesspools, now becomes troublesome from the difficulty encountered in finding soil sufficiently porous to absorb the increased volume of fluid, and finds its way, either with or without pipes, to the brook which passes through the town. The result is not only of great importance to the city of Boston, but to the people of Marlboro as well, for, though they may have a water-supply of their own which is pure enough at present, the growth of the town is already extending to the borders of their own pond near their pumping-station. From this part of their town the natural drainage is all toward the pond, and there is a certain prospect of having the water which is used by this part of the town finding its way directly back from whence it came, in the form of sewage. Moreover, the pollution of the brook, which discharges into the Sudbury River, is by no means conducive to the health of the village. Portions of this brook are covered over by flat stones laid upon rough stone walls—a kind of structure peculiarly adapted to the collection of filth when the water passing through such culverts is filthy. The town authorities have been considering the question of sewers for some time, but are apparently indisposed to move vigorously. The great difficulty, of course, arises from the cost of disposing of the sewage when collected. The collection would be comparatively a simple matter, for the topography is simple and the slopes of the streets are such as to insure a good flow. There is but one way available to dispose of it to advantage—viz., by distributing it upon land to be acquired and prepared for the purpose. Until this is done, the filth of the growing village, washed along by an abundant water-supply, will find its way into the Sudbury River just as surely as water runs down hill. It remains to be seen if the existing laws of Massachusetts are sufficient to protect the city of Boston in this as well as in many other similar cases. If they are not, some measures will probably be taken to render them more efficient. In the meantime, it would be a mark of wisdom if the town should proceed to protect

not only the city's water-supply, but its own, by maturing some plan of action that will meet the case.

The city of Pullman, Ill., is a somewhat remarkable instance of a new and growing community which has foreseen this trouble and taken timely measures to control it. The "sewage-farm" of Pullman is spoken of as a source of profit. So much the better if it is so. But we think the profits arise mostly from the native excellence of the soil of the Illinois prairies, rather than from the addition of sewage. Most towns will be fortunate if they can maintain sewage-farms at a moderate net cost, and must not look for profits, except indirectly, through improved sanitation.

THE PLUMBERS' AND DEALERS' TRADE-PROTECTION CONTROVERSY.

THE *American Architect* greatly overrates the power and influence of the men claiming to speak for the plumbers of the United States on the question of trade-protection, in assuming that there is the slightest possibility that architects will have any trouble in getting work done and appliances used which they may have seen fit to specify. Our contemporary may rest assured that the great majority of plumbers in the various associations and the larger number outside would be only too glad to take work from an architect's office, using whatever appliances the architect may specify, notwithstanding the threats and talk of certain men who are in position to issue bulletins without cost to themselves. It would have been more to the point if dealers had refrained from asking the architects to protect "their interests." It would have been better if they had stated the interests of their clients, since these clients' interests require that architects should not be imposed upon by misrepresentations. This is probably what the dealers had in their minds when they sent their letter, and that they had reason to expect it the threats of certain noisy men indicated. We believe they have overestimated the influence of these men and the injury they could do them. We regard the whole thing as a great deal of a "tempest in a tea-pot," and we think it would be better for the "National Plumbers' Associations" and the manufacturers if they would let this whole business drop as an association problem.

Want of space is the reason that we do not print the numerous letters and expressions of approval that we have received on the position taken by THE SANITARY ENGINEER on this question.

We believe leading manufacturers accord plumbers all the protection that it is practicable to grant. The most clamorous plumbers, however, are those who will not make the slightest temporary sacrifice to deal with firms that act fairly by their customers. These men buy the cheapest goods they will be allowed to use, and confine their efforts to advocating unreasonable demands at society meetings.

WORTHLESS ADVERTISING.

ALL manufacturers of and dealers in plumbers' supplies who desire a free advertisement at the cost of the members of the National Association of Master Plumbers should write a buncombe letter to an officer of the association, expressing sympathy with the Baltimore resolutions, printed on page 335, issue of September 11. Such letters cost nothing but the postage and the trouble of writing them, and a fund seems to be available for publishing the rubbish. Some people are making a great mistake in assuming that any considerable number of plumbers in the United States are fools.

HOT WEATHER IN THE TENEMENTS.

THAT the visits of the physicians sent out by the New York Board of Health through the tenement districts should cease with the end of August has before this been unfavorably commented on; but the mistake of this course has never been so strikingly demonstrated as by the

recent heated spell. In fact, there has been no week this year when the visits were so much needed as the very one after they were discontinued. Those of our readers who are fortunate enough to have resided in a cooler climate during that oppressive season may form some idea of the wretchedness of continuous hot weather in the crowded tenement-house districts, from the following graphic description, which we extract from the *Telegram* (September 8):

"The evening had been almost insupportable. In the tenement districts this was painfully the case. The inhabitants were compelled to sit in their close rooms or recline upon the sidewalks. There were families in East Houston Street situated in apartments shut in from the light of either day or night, and utter strangers to a breath of pure or even street air since the day they were constructed and let. Some of these families were large, ten and twelve in number. The father had been working in the ferocious sun or a dusty workshop all day. The mother had been washing, ironing, cooking, and taking care of the children, with a stove rendering the atmosphere almost unbearable and the youngsters cross, ill, and intractable. Night had come on, supper had been scarcely touched, for nobody could eat in such a terrible place. The lamps had been lit in the street, and the jaded husband had gone to the neighboring beer shop or groggery for temporary exhilaration. Every doorstep was occupied, the cellar-tops and steps were thronged by men, half-grown boys, and hoodlums, who were determined to spend the night on these presumably cool lapidary couches. Mothers with whining, whimpering babes at their breasts, sat on the curbs wide awake, unable to get a wink of sleep, and praying that the morn might bring some respite, even a degree of lower temperature."

Yet, with the knowledge of all this misery and suffering, the poor will flock to the cities.

EUROPEAN HOTEL CHARGES IN CASE OF DEATH.

THE American press has been more or less indignant over what it seems to consider the brutality of Spaniards, because a proprietor of a hotel at St. Sebastian, Spain, required payment for the alleged refurnishing of the apartments occupied by an American gentleman who died of heart disease, on the alleged theory that it was contagious. The fact is, the conduct of the Spanish hotel proprietor is no different from that of managers of continental hotels everywhere. We have not the slightest doubt that if a guest of a hotel in Paris died from the effects of amputation of a limb, a demand would be made upon his estate to pay for the supposed entire refurnishing of his apartment. This swindling custom reminds us of the advice a gentleman once gave a young lady who was complaining of feeling unwell at one of the leading Paris hotels, to the effect that if she thought she was going to die, she had better go out and get into a third-class cab, as her friends would then only be obliged to pay for the cab; whereas, if she died in the hotel, the cost of its refurnishing would probably be demanded. It is quite unnecessary to get excited over the action of the Spanish innkeeper, since this custom of European hotel managers is only one of a series of annoying methods of making up the receipts of a hotel by an infinite number and variety of detailed charges.

BACTERIA AND BANK-NOTES.

WE have already alluded to the discovery by Paul Reinsch, of Erlangen, of minute algæ and of the so-called bacteria upon the surface of coins. (See THE SANITARY ENGINEER, May 8, 1884.) A recent number of *Nature* contains a letter from Jules Schaarschmidt, of Kolosvár, describing the various organisms which he has found upon the surface of Hungarian bank-notes, even on the cleanest. On the surface of all the paper money the bacterium of putrefaction (*B. termo*) is always to be found. Various forms of micrococcus, bacillus, and leptothrix were also more or less common. The author says, "From a hygienic point of view, also, the investigation of the commonest necessary household objects may not be superfluous," but does not attempt to say how far the matter is of practical importance. Though these discoveries possess a scientific interest, we are yet unable to advise our readers against accumulating all the bank-notes they can by honest and honorable methods.

OUR BRITISH CORRESPONDENCE.

The Small-Pox in London—Official Returns—Increase in Sale of Frozen Meat—An Odd Use for Sewage—Building in London—Health Exhibition—Hygienic Congress.

LONDON, September 6, 1884.

THE official returns of the Metropolitan Asylums Board, relative to the recent small-pox epidemic in London, have just been published. It appears the epidemic began in March, and is now virtually at an end. The date when the disease was at its height was July 4, when there were 1,380 patients in the hospitals under the management of the board. The increase in the number of persons attacked in London from March to July was very rapid. On the 1st of March there were only 126 patients in all the London hospitals under the Asylums Board. In April the number rose to 440, in May to 740. At the beginning of June the number was 1,000, and the increase was maintained till July 4, when the number was as stated above. Since this last date the cases have rapidly decreased, until now there are only 504 under treatment in the hospitals. The greatest number of patients admitted in one day was 100, on May 26. During the past month the daily admissions have been about 12, which is almost the normal condition of the disease in London. The Metropolitan Asylums Board has at its disposal a total number of 704 beds to accommodate fever—i. e., scarlet and enteric—pauper patients, and of these 324 are at present unoccupied.

The trade in frozen meat is rapidly increasing, and storage accommodation at the docks has recently been augmented. Since the East and West India Dock Company's first store came into use, in July, 1882, 143,845 sheep and 1,519 quarters of beef have been stored. The present stock is 12,594 carcasses from New Zealand, and 18,000 from the River State. The storage capacity of the company's three stores is as follows:

Sea Witch store....	27,000 cubic feet.	23,500 sheep.
Robt. Morrison store..	31,853 "	30,000 "
South Dock store....	53,020 "	46,800 "

A new use has been found for the liquid town-sewage. It appears that on Thursday last a fire, which is supposed to have been accidentally caused, broke out on the Bishop Stortford Local Board Sewage-Farm, and at first it was feared the whole farm would be destroyed, but the local fire-brigade being quickly on the spot, and having at hand a plentiful supply of liquid in the shape of the town-sewage, which was being pumped on a crop of mangolds close by, the fire was speedily got under control. The damage done, thanks to the liquid sewage, was small.

During the year 1883 21,110 houses were built in London, forming 361 new streets and one new square, covering a distance of 56 miles, 84 yards. This is a decrease on the preceding year, but three times as great as the number in 1873. The number of fatal accidents in the streets which came under police notice was 106, and the number of persons injured in the streets was 3,532.

Visitors to the Health Exhibition continue as numerous as ever. Last week 168,870 passed the gates, making the total from the opening on the 8th of May, 2,195,064.

The Hygienic Congress, which has been sitting at The Hague during the past week, has voted a resolution calling upon the Dutch Government to arrange for an international conference on cholera, with the object of establishing a permanent international epidemiological committee and preparing a penal sanitary code. The doctors in Italy seem to be having rather a bad time of it during the present cholera visitation there. The poor people have got it into their heads that the doctors wish to kill them and so refuse to see them. In some districts the doctors have had to flee for their lives from the thoughtless populace.

I see that the Hygienic Congress has denounced the modern system of education and competitive examinations as being injurious to health. A good deal of discussion has been going on over here lately with respect to over-pressure in elementary schools; but the opponents of the present system of education have not succeeded in making out a very strong case. SAFETY-VALVE.

THE International Medical Congress, whose sessions closed at Copenhagen August 16, voted to accept the invitation of the American physicians to hold the next meeting at Washington in 1887.

SYSTEMS OF HEATING HOUSES IN GERMANY AND AUSTRIA.

(From an Occasional Correspondent.)

DARMSTADT, August 22, 1884.

In the greater part of Germany and Austria, the system of heating the houses is, to a great extent, insufficient, uneconomical, and inconvenient, being, to a certain extent, a mere modified and improved form of the method of the ancient tribes, of heating large stones or other large bodies in their fires and allowing them to cool off in the rooms or huts, thus heating the air. The stoves almost universally employed in most private, and even public houses, are of more or less ornamented porcelain, of rectangular cross-section, and quite high, containing in them a zig-zag flue, the fire-place being at the bottom. The fire heats the long flue in the stove itself, which then heats the air of the room.

The disadvantages are numerous. The walls of the stoves being made of one of the best non-conducting materials, require a great amount of heat, and for quite a length of time, until they conduct the heat through them to the air of the rooms; so that most of the heat of the walls passes through the flues into the chimney, and, of course, is lost. Owing to the zig-zag form of the flues, the draught at starting is very poor, and the stoves being made of many separate pieces, frequently contain many cracks, so that the room is often filled with smoke and disagreeable gases, but as this is a daily occurrence, one is expected to become accustomed to it. It is still more disagreeable, as the coal used resembles our bituminous coal and gives off much more disagreeable gases if not completely burned.

A further disadvantage is that the fire has to be lighted every morning, and that it requires several hours, sometimes, before the non-conducting material of the stove is sufficiently heated to warm the room. For a man in business this is especially inconvenient, as he either has to be aroused very early in the morning by the servant starting the fire and by the smoke, or else the room is cold for the few hours in the morning while he is using it, and when he is about to leave it, it will be beginning to become warm, or, in other words, it is cold while he uses it and warm in his absence.

Every room has to have its own stove. Hallways and bath-rooms (when there is one) are seldom heated, and therefore have the temperature of out-doors, so that one frequently takes cold in going from one room to another. All doors must be kept closed, thus preventing all ventilation by means of hallways, stairs, etc. The fire being allowed to go out as soon as the walls of the stove are warm, there is no ventilation by means of the draught of the fire.

The heat in the walls of the stove after one firing is said to be sufficient for the day. The heat of the inside of the flues, which is much greater than that of the outside, is lost in the chimney after the fire is out, as there are always enough cracks or openings to allow a slight draught.

Another objection is that they take up much room and require a very solid foundation.

American stoves are sometimes used, but apparently are not liked, as the "Regulirung" (draught-regulation) seems to be far beyond the conception of the average German servant.

Another method, known as "Hauber's Patent," has been introduced in many places, especially in Munich, in the last few years, and seems to be, both theoretically and practically, one of the cheapest and most economical methods.

Before explaining it, it may be well to call attention to the fact that in most furnaces or stoves the fresh coal is thrown over the hot walls, and is therefore heated in a flame containing little or no free oxygen. The consequence is that large quantities of combustible gases, rich in heating qualities, and a large amount of black smoke, containing unburnt carbon, escapes unused into the chimney, carrying with them heat, thus representing a great waste. If these gases could be burned while hot there would be considerable saving, besides avoiding the disagreeable black smoke. This could be done if the fresh coals could be placed under the hot ones, so that the gases given off by them are burnt while passing through the hot coals and while the gases contain free oxygen. This is the principle of the system to be described and seems to be accomplished.

A single stove, or "element," as it is called, is shown in about one-twentieth size in the accompanying cut (Fig. 1). It consists of a cast-iron cylinder, C, open at the top and containing at the bottom the contrivance *d*, which is like an inverted frustum of a cone, perforated, so as to allow

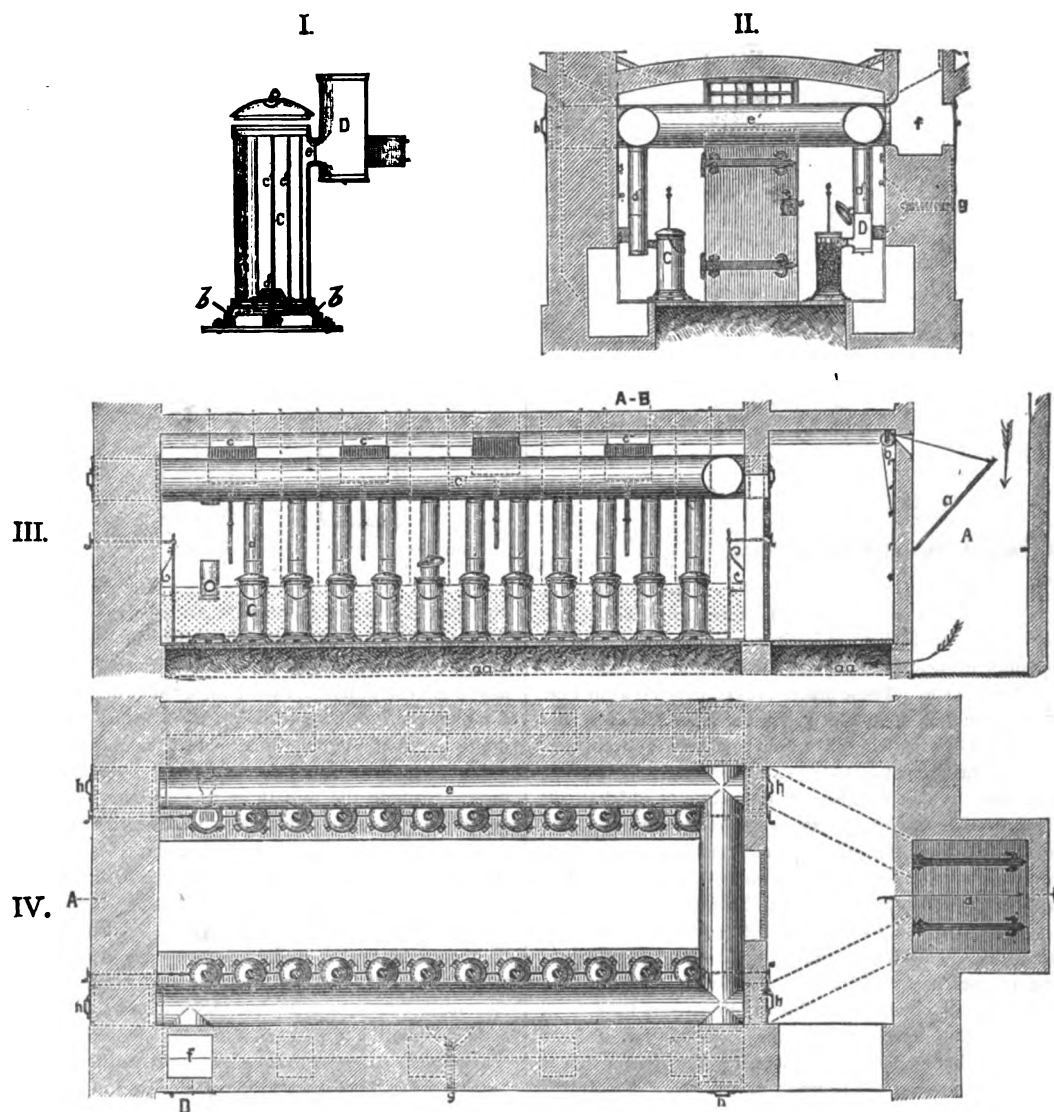
the air to enter, but preventing the coal from falling out. D is the flue fastened to the wall and ceiling, forming a great portion of the heating surface; *b b* is the fixed cast-iron base. The cylinder C fits loosely on the base *b b* and at *e*, so that it can be taken away and replaced by another without requiring any fitting other than that the opening *e* should be opposite that in the flue D. The "elements" or cylinders are filled to the top with coal in the coal bin, and carried by means of a handle at the top into the rooms, thus serving at the same time as coal-bucket and stove. A small charge of wood and paper or shavings is placed on the top of the coal. When the room is to be heated it is only necessary to light the paper and put the lid on somewhat slanted, so as to allow the draught to enter at the top until the coal is ignited, after which the lid is closed and the draught at the bottom regulated according to the amount of heat required.

As is easily seen, the gases from the fresh coals will have to pass over the hot ones, thus burning them completely, and thereby avoiding smoke and utilizing all the heat of

For heating a large building, a so-called "battery" of stoves is placed in an apartment in the cellar, from which the hot air passes by means of pipes to the rooms. Such a chamber is shown in sections and plan, in Figs. 2, 3, and 4.

The following data were given to the writer by the Austrian Company: A charge of coal weighs about 10 kilog. (22 lbs.) and burns from six to fifteen hours, according to the amount of heat required. On the average two fillings a day are required. This, at the rate of \$4 per ton, would be about four cents per charge. For the heating and ventilating, in which the air of the rooms is renewed three times per hour, one element with bituminous coal will be required for every 85 to 90 cubic metres, and for brown coal, 60 cubic metres; for hallways, 100 to 120 cubic metres.

The cost of an element in Austria is about \$12 (30 fl.); for heating by means of chambers in the cellars, about \$20 to \$24 per element, including all fixtures, but not the erection. C.



the coal. No attention is necessary until all the coal is consumed, when the cylinder is replaced by a filled one.

The joint at *e* need not fit tightly, as the section at that point is small as compared with that at the flue, so that there is a greater velocity of the gases at that point. Even if the stove is placed as much as half an inch from the opening no gases will come out at that point if the draught is good.

The advantages are manifold. It is very economical, requiring, as it is claimed, only twenty-five to sixty per cent. of the amount of coal used in the ordinary systems. There is no smoke or incomplete combustion, and therefore no such loss of heating material. There is very little attention required, and no dust from coal or ashes in the rooms. It is very easily regulated by a valve at the base. The stoves being simple in construction are comparatively cheap.

This system is used principally for large buildings, shops, schools, hospitals, etc., where it seems to be very satisfactory. It is also frequently used for drying-rooms where very high temperature is required.

COLORING MATTERS FOR CHILDREN'S TOYS.

IN accordance with the suggestions of the Consulting Committee of Hygiene, a circular of the Minister of Commerce, dated March 26, 1884, makes certain restrictions which are to be observed in the coloring of toys.

It is absolutely forbidden to make use of poisonous substances in coloring these articles, especially arsenic colors, Scheele's green, Schweinfurt green, the oxides of lead, red-lead and white-lead, chrome-yellow, mercury compounds (for instance, vermillion), and finally, copper salts.

This order, however, makes exceptions as far as articles made of sheet-tin and rubber balloons are concerned. Chromate of lead, white-lead, and vermillion may be made use of for these, provided these colors be fastened on by a thick varnish. When, however, the color is applied by means of paste, all the colors named are forbidden.—*Le Genie Civil*.

THE State Board of Health of Massachusetts has recently appointed Mr. John H. Terry, of Boston, inspector under the adulterated food and drug law.

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

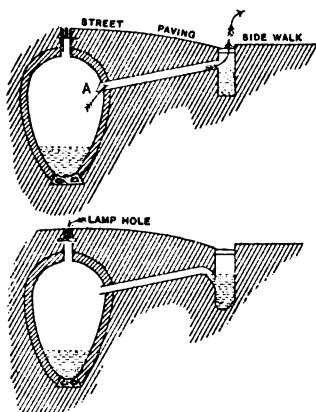
No. XXIII.

(Continued from page 246.)

ON SEWERAGE AND SEWERS.

STEP by step the London sewers are being bottled up, and year by year they are being rendered almost unventilated, excepting by certain vents in the streets, commonly called lampholes, and also through the gulley gratings by the sides of the streets. This is a serious question, and before many more years pass over it will have grown to be so important as to force itself before the public in such a way as to compel something being done to remedy this state of things. Sanitary engineers are at a loss to know what to do, and public authorities are either at variance, or are each working their own way—that is, when they have a way of their own, instead of being united in their action.

In some districts may be seen here and there an iron pipe up the side of a building, which is supposed to be quite sufficient to ventilate a sewer of perhaps several feet sectional area. The lampholes spoken of above very rarely exceed a third of a foot as space for air to pass through, and even that small amount of opening is generally contracted and in a great many cases choked with street refuse.



FIGS. 1 AND 2.

The side gulleys are not intended as sewer-ventilators, but any one when passing one of these places would not require to be told what duties it was performing; in fact complaints are heard daily about the nauseous smells which escape from them. These places are constructed as in Fig. 1, with a tide-flap, as in Fig. 5, fixed at A, but in some districts the silt-box is being taken out and a gulley-trap, constructed to catch driftings and street washings, is fixed in lieu of same, as shown in Fig. 2, on looking at which it will be noticed that as long as the water does not evaporate sufficiently to break the seal, no smells can pass through it. Fig. 3 is an enlarged view of this gulley-trap. Fig. 4 has a valve-trap in combination with the water-trap. When this is done, a moment's thought will prove that public authorities are themselves aggravating an evil, without providing another source for pent-up air to escape, or stagnant air to be put in circulation. Boxes of charcoal have been tried in ventilators to deodorize the sewer-air, but are now discarded as being perfectly useless, for the reason that it is impossible to keep the charcoal dry, it being of no value when in a damp or wet condition; and if packed so closely as to prevent sewer-air from escaping without coming under the purifying influence of the charcoal, the free circulation of the air is impeded, or perhaps entirely obstructed.

It has been suggested that the street lamp-posts should be adapted so as to act as sewer ventilators. In some places a stoneware-pipe air-drain has been laid from the sewer and built up in the party-walls of houses, to the no small annoyance of the inmates, who could not tell where the smells came from until the walls were cut away and betrayed the source.

It is rumored that a patent has been taken out for passing sewer-air through wire gauze heated with gas-jets so as render it harmless, but if this is done, it should discharge at some considerable height. As to its being harmless, is open to considerable doubt. It has been proposed to have connections from sewers to any high factory chimney-shaft that may be near, and no doubt this would be a good plan, but these shafts are so far apart that they would be of about as much use as trying to empty the sea with a pail.

This ventilation of public sewers is rather beyond plumbers' work, but at the same time it has a great deal to do with the success of the sanitary arrangements of houses, and in more ways than one. For instance, in London the rain-fall is discharged into the same sewer as the sewage proper.

The result is, after a heavy fall of rain, the sewers are so fully charged as to reduce the air-space, and if no vent is provided for this compressed air, it will force its way back up the tributary drains which convey sewage from the houses and possibly gain access to the habitation, to the injury of the inmates, by breaking through the water-seal of the traps; for it must be remembered there are thousands of houses that have no ventilation-pipes to the soil-pipes or drains or any other protection beyond a trap under the water-closet or other fitting, although in some instances the pipes which conduct rain-water from the roofs have been connected directly to the drain and so act as vents. In some cases where the sewers are not efficiently ventilated, when the water subsides after a storm, the seal of any of the traps in the house can be broken by the water being syphoned or forced out, by the air rushing through to fill what would otherwise be a partial vacuum in the sewers.

Again, in a badly ventilated sewer the gases become more concentrated, and putrefaction of the contents takes place more rapidly, and even if these gases do not actually force themselves through the water in the traps (which some people maintain they do) still it becomes so impregnated as to be converted into sewage, and so give off foul emanations inside the house.

These sewage-gases, or sewer-air as some prefer to call it, seem to play a very peculiar part. Hundreds of people die from the effects of breathing them, so the doctors tell us; but as a fact, the writer has questioned scores of sewer-men, some of whom had worked in sewers for more than twenty years, and not one had ever had any illness or suf-

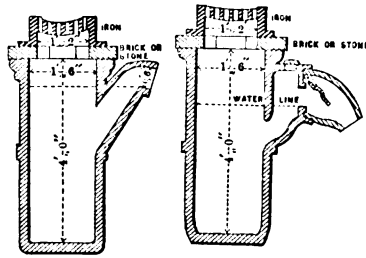


FIG. 3.

FIG. 4.

fered from their effects in any way. On asking a leading question as to what complaint these men suffer from most, the answer is almost invariably "rheumatism." The writer has been down into a great many sewers, but never felt any ill effects, although two or three times he has had slight diarrhoea and a sickly feeling when working near an open drain, or when removing dirty old fittings, etc. Dr. Richardson, in a lecture at the Parkes Museum of Hygiene, recently, made the remark on this question that "he supposed they (the sewer-men) got so used to it that they were not influenced by these emanations, and cited a case where he went near some men who were removing refuse from which sulphuretted hydrogen was escaping, and which made him vomit and gave him diarrhoea. These men only laughed, and said it was *rather warm*, and went on with their work as if it was nothing unusual to them. As doctors make the statement that these odors from sewers do make people ill and in a great number of cases cause death, it behooves plumbers to take every precaution that human ingenuity can invent for keeping them out of dwellings or places where they may be inhaled. Dr. Shirley Murphy told the writer some time ago that the improvements made in sanitation during the last few years had been the cause of adding quite two years to the average period of life.

Dr. Lyon Playfair made the remark in the House of Commons on the 4th of March, that "in one generation the span of human life had increased by two years." This was on the question of improved dwellings for the poor and the influence it had upon health.

At a meeting of the Executive Committee of the Parkes Museum in 1880, Sir William Jenner made the statement that "the sewers of this metropolis are always filled with the poison of typhoid fever, with diphtheria, and a series of other terrible maladies."

Coming from so high an authority we cannot do otherwise than accept this as a truism and do all that can be done to obviate the effects.

The first question to consider is, Where is the starting point for the sanitary plumber? The answer is, If these evils are in the sewers, keep them there in preference to allowing them to pass into the house drains. If they can be got rid of by destruction or be dispersed in a proper and harmless manner, by all means do so, but keep them away from the dwelling. The proper place to start from is as near the general sewer as possible. There are several con-

trivances for this purpose, and one of the most in use is what is commonly called the "tide-flap," which is fixed on the extremity of the house-drain inside the sewer. This consists of a galvanized-iron plate, suspended on a hinge,

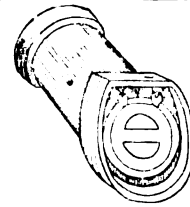


FIG. 5.

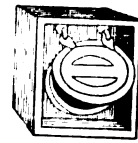


FIG. 6.

or in some cases on two pairs of iron-chain links, over the end of the pipe, so that it fits as closely as possible. This contrivance is not to be trusted in any way; a match, piece of orange peel, piece of paper, and the thousand and one things that float down the drains, get between the flap and its seating, and so render it useless for keeping back smells, and it is a well known fact that rats can open them and so pass into the house-drains.

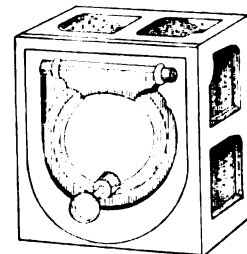


FIG. 7.

There are a great many different kinds of these flaps (see Figs. 5, 6, and 7), and no doubt some are better than others, but for the reasons given, it is almost impossible to get any piece of mechanism that will keep back smells and at the same time allow the sewage to flow freely away. The only device which seems to answer the purpose is what is known as a water-trap, some descriptions of which will be discussed in another paper.

(TO BE CONTINUED.)

PUBLIC STEAM-SUPPLY IN PHILADELPHIA.

THE application of the Philadelphia Steam-Supply Company for permission to lay its conduits in certain streets of the city was considered lately by the Board of Surveyors, which ordered the company to file a plan and profile of a detailed nature of each square on which the pipes are to be laid before the work is commenced. The board also prohibits the steam-pipe from being laid within eighteen inches of any water-pipe, and the Gas Trust is authorized to repair all injuries caused to gas-pipe, by reason of laying of the steam-pipe, at the expense of the Steam Company. The company must make good any sewer or sewer-connection injured by it, and if the privilege is not exercised for one year after beginning the supply of steam, this would be equivalent to a forfeiture of the privilege. The first station now being erected to supply the steam is being constructed at Seventh and Arch Streets, and the streets under which the company has asked the privilege of laying its conduits, in the first plans, are Fourth, Fifth, Sixth, Seventh, Eighth, and Ninth, from Vine to Walnut Streets, and on Market, Arch, Race, and Vine Streets from Fourth to Ninth Streets.

LONG ISLAND NUISANCES.

A REPORT from Dr. Arthur Hollick, Inspector of Stench Nuisances on Long Island, was presented to the State Board of Health, at Albany, September 8, showing the present condition of things near Newtown Creek, Queens County. In most of the establishments a marked improvement was noticed since the report of 1883, some of the worst having been closed altogether, and better methods having been introduced into many of the others. Dr. Hollick sums up the result as follows:

"From these memoranda it will be seen that the parties most to blame at the present time are Kehoe, Rosenzweig, and Muller. The general improvement since last summer can hardly be appreciated without having seen all these establishments at their worst. The creek itself is now the most offensive nuisance of all, fouled as it is from sewage and all refuse. Even the total cessation of all industry along its borders would not render it clean. The only remedy would be bulk-heading and dredging, so that there would be no mud flats along its borders to be alternately overflowed by the tides and baked by the sun. I understand that Brooklyn is already taking steps to divert its sewage from the creek into some other channel. If this be so I venture to say that the most prolific source of nuisance from the region will be eliminated."

THE INTERNATIONAL HEALTH EXHIBITION. No. XVII.

(Continued from page 341.)

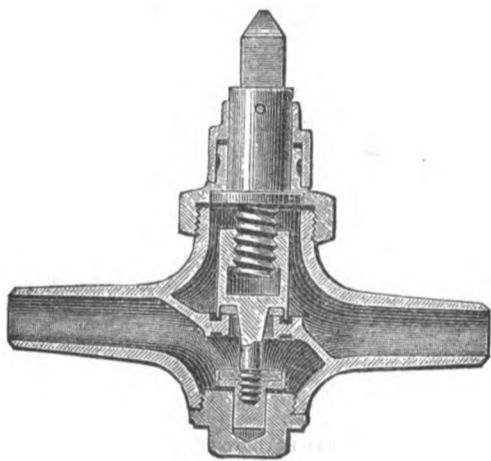
It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

EASTERN ANNEX.

THE Eastern Annex is devoted to sanitary appliances and water-fittings of all sorts.

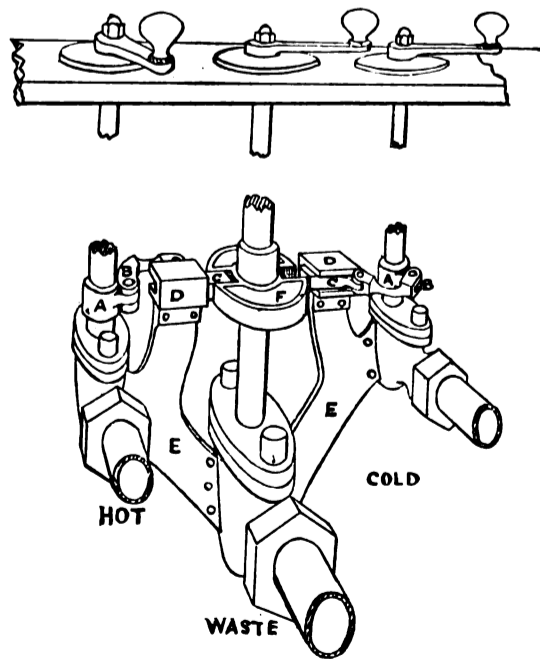
The exhibit of Beck & Co. (limited), 130 Great Suffolk Street, London (stand No. 541), shows a great variety of specimens of brass-work, street-hydrants, gate-valves, iron-pumps, water-closets, etc. Among their exhibits we noticed a cistern on the syphon principle, in which the syphon is started by a depression of a piston in a chamber, which forces the water over the opening of the syphon, which is another application of a well-known principle.

Among the water-fittings, and claimed to be a recent novelty, is a valve stop-cock (Bell's patent), the section of which we show. The object aimed at in this cock is to



disconnect from any house, under pressure, without disconnecting the pipes or emptying the main. By unscrewing the spindle in the upper valve-disk the lower disk is raised until it is brought in contact with the underside of the valve-seat, which is common to both disks, and where it is held by the pressure. The upper portion can then be removed and the cover screwed down.

Stidder & Co., 50 Southwark Bridge Road, London (stand No. 534), exhibit an arrangement for preventing the simultaneous opening of waste and supply-cocks for baths, etc. Short crank-arms, A, are fixed on the spindles of the supply-cocks. These arms are connected by curved links, B, to square bolts, C, sliding in grooved guides, D, formed

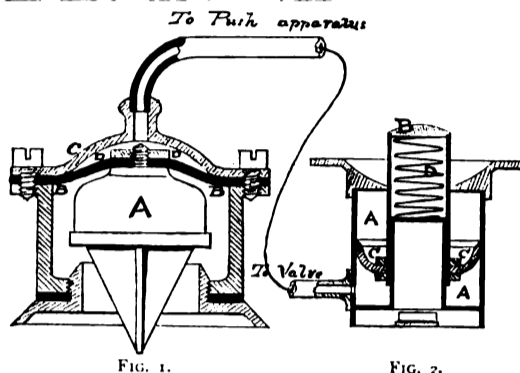


in the iron frame in which the cocks are fixed. A disk, F, is keyed on the spindle of the waste, which disk has deep radial notches or recesses formed in its circumference. These notches correspond in size to the sliding bolts C, so that when the waste is closed the notches are in line with

the bolts C, allowing the supplies to be opened, but locking the waste by the bolts C engaging with the notches in the disk. The illustration shows the waste locked by the hot supply, which is open, the cold being closed.

Milton Syer, of Peckham (stand No. 519), exhibits a pneumatic water-waste preventer. It consists primarily of an ordinary round cistern-valve, A, Fig. 1, to which is attached a rubber diaphragm, B, fixed in a frame above it. A dome-shaped cover, C, is screwed over the diaphragm, forming an air-chamber, D. On exhausting the air from this chamber the valve A is raised, giving the required flush.

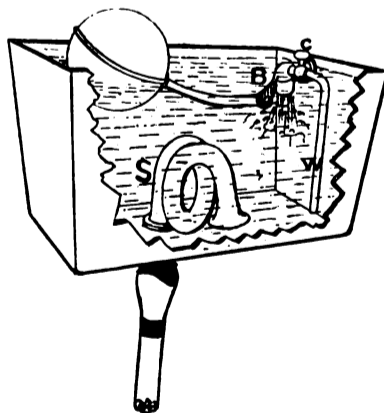
The exhausting portion of the apparatus is shown in Fig. 2, where C is a cup-leather working in the main cylinder A. On pressing the push-tube B, the cup-leather is



carried to the bottom of A, the coiled spring D returning the cup-leather to its original position, and in doing so exhausts the air from chamber D, Fig. 1, which is connected to cylinder A, Fig. 2, by a tube of small diameter.

The idea of lifting a valve is not new, Tyler & Son and others having made devices on this principle. Their method of exhausting the air was different, however. That employed in this exhibit, therefore, is the main feature of interest.

R. F. Dale & Co., Bear Lane, Southwark, London, Eng. (stand No. 516), exhibit a variety of water-closets and other sanitary appliances. Among these is a side-outlet valve-closet, in which the overflow is so constructed that in case the pan of the closet is filled above the overflow-outlet it is claimed that it will syphon out to the standing water-level without breaking the seal of the trap beneath the water-closet. They also exhibit a double syphon-cistern, which was fully described in the "Novelty" column of our issue of July 31, designed to give the flush and after-flush. A somewhat peculiar form of automatic syphon-cistern is also shown on this stand, of which we give an illustration. S is the curled syphon, with bell-mouth opening about three-fourths of an inch above the level of the floor of the cistern; the ball-cock C has branching



from it the pipe W, carried nearly to the bottom of the cistern, with a tap at C, whereby a constant supply is kept up. The float is attached to the ball-cock in such a manner that the cock is only opened when the float is lifted; as soon therefore as the water supplied through the weeping-cock C and pipe W reaches a sufficient height to lift the float the ball-cock is opened, and the water thereby supplied is sufficient to give the necessary head to set the syphon in action.

SOUTH CENTRAL GALLERY.

Stand No. 375 is that of Henry Conolly, of Hampstead Road, London, N. W. This is one of the most conspicuous exhibits in the matter of location, and considerable money must have been spent in connection with it. A great variety of bath and lavatory fittings are shown, likewise

water-closets and plumbers' material, gas-fixtures, etc. In the fitting up of a bath-room a feature worthy of note was a ventilator in the centre of the ceiling, and also a hollow cornice with perforations, connected with a heated tube for carrying off any steam that might escape upward from the hot water. We noticed, also, cast-lead rain-water heads, and an improved method of fixing iron rain-water pipes so that they shall not touch the walls, and can be turned around for convenience of painting at the back portion, also facilitating the replacement of a broken length by a sound one. A form of syphon-cistern was shown, intended to discharge automatically at intervals. An ordinary cistern contained a bent syphon-pipe and a ball-cock. The ball-cock was closed until the water level was at a certain height, when the float being lifted the valve was suddenly opened, and the influx of water was sufficient to start the syphon. The ball-cock had branching from its shank a small fret-cock that could be adjusted so as to let the water simply dribble into the cistern until it lifted the float, when, as previously explained, the opening of the ball-cock started the syphon.

(TO BE CONTINUED.)

INTERNATIONAL HEALTH EXHIBITION.

CONFERENCE ON WATER-SUPPLY.

THE conferences on sanitary subjects at the International Health Exhibition have had nothing of an international character. As a rule the papers which have been read have been read by Englishmen, and in the discussions they have usually restricted themselves to matters of local—or at most national—and not of international interest. The conference on water-supply, held on the 24th and 25th of July, was no exception to this rule. Sir Frederick Abel occupied the chair. In the two days devoted to the conference, seventeen papers were read on various subjects connected with water-supply, which were grouped under three heads:

1. Sources of supply.
2. Quality of water; filtration and softening.
3. Methods of distribution; house-fittings; discovery and prevention of waste, etc.

According to custom the papers were all printed and in the hands of the audience, and the number of papers was so great that the time for discussion was very limited, and the discussion was largely devoted to questions connected with the water-supply of London. The papers will, no doubt, appear in corrected form in the *Journal of the Society of Arts*, and we can hardly even give an abstract of them. Many of them were of the most elementary character, although the audience was made up in great measure of those professionally acquainted with the subject.

The paper of the greatest general interest was one by Mr. William Anderson, detailing the Antwerp experience in the use of spongy iron, and giving the facts which have already been communicated to THE SANITARY ENGINEER by Professor Nichols (see page 220 of the present volume). Mr. Baldwin Latham read an interesting paper on the "Softening of Water." He described the original Clark process, and the so-called Porter-Clark process, of which a description has been given in THE SANITARY ENGINEER, in describing the exhibit of Mr. Porter. (See issue of August 28, page 292.) He also gave a list of the patents which have been taken out for the softening of water by various chemical substances, since the date of the patent of Professor Clark, which covered the use of lime for the purpose.

Dr. H. C. Sorby, in a paper "On the Detection of Sewage Contamination by the use of the Microscope, and on the Purifying Action of Minute Animals and Plants," alluded to the number of cyclops and other entomostraca in various waters and to the important part which they play in the natural purification of water. The paper was, however, a disappointing one, as he left unmentioned the line of research began by Koch and introduced into England by the late Angus Smith—namely, the method of cultivating in prepared gelatine the germs or micro-organisms which may be in the water, and thus obtaining objects for microscopical examination. Although this method has not yet accomplished any great practical results, it is the principal method with which water is now being studied from the biological standpoint, and certainly should have been described in a paper with the above title.

Dr. Odling's paper, "On the Chemistry of Potable Water," as printed, was mainly a disguised plea for the good quality of the water supplied by the London water companies. He found fault with other chemists (read Dr. Frankland between the lines) for using the term "impurities" with reference to many innocuous substances

naturally occurring in water, on the ground that this term deceived the public, whose understanding of it would be different from that of the chemist. He then proceeded to assume that "the organic matter of water may, without risk of serious error," be taken as containing forty per cent. of carbon, and that by multiplying the amount of carbon found by two and one-half, a sufficiently correct expression may be obtained for the organic matter present. Without giving the facts on which he based his estimate, he thus leaves us to infer that the organic matter in a polluted water like that of the Thames, in a peaty water like that of Loch Katrine, and in a deep-well water like that of the Kent Company is very much the same thing, and, at any rate, may be taken as containing forty per cent. of carbon. After showing how small the absolute amount of organic matter in potable waters is, he says: "Whether or not variations within the limit of such a small proportion of dissolved organic matter present in potable water * * * are matters of any real significance must obviously depend on the character of the dissolved organic matter present in the different waters. This is a subject for subsequent consideration. It will suffice for the present to observe that, so far as mere quantity of organic matter is concerned, the water supplied to London from the Thames and Lea takes, on the whole, precedence of the highly reputed and deservedly reputed water furnished to Glasgow; as, doubtless, the same London water will take precedence of that about to be furnished to Manchester." If the matter was left here—as it was left in the proof-sheets distributed to the audience—the public who are so easily misled by the "impurities" of other chemists would certainly not fail to draw the inference that the Thames water is on the whole better than that of Loch Katrine. And this impression would not be wholly removed by the admission in the brief and hastily-spoken conclusion of the paper, that the *quality* as well as *quantity* must be taken into the account. Even if the doctor believes the Thames water the best in the world, there are many who would require more proof than he gave that the organic matter occurring therein is a matter of sanitary indifference. In concluding his paper he made the somewhat startling assertion that "there is no presumption of the presence in river waters of disease-producing organisms, and what little is known of their life history, and the evidence from what has been observed on the health of populations would lead to the inference that they do not develop, propagate, or exist, in such water so as to be capable of acting prejudicially." This statement is optimistic and at variance with the belief of very competent observers, and is rendered especially doubtful by recent observations on the cholera bacillus.

A paper on "Water-Supply for Fire Extinction" was devoted to maintaining the proposition "that efficient hydrants form, as far as our experience goes, the only effective weapon with which fire-brigades can successfully cope with fires." He showed by diagrams the enormous cost of the fire-brigades in New York, and in other cities where the insufficient pressure in the mains require the use of fire-engines. He also showed by a striking diagram the very small proportion which the water used in extinguishing fires bears to the total consumption.

Several papers discussed the question of a "Dual Supply," and the general conclusion seemed to coincide with that expressed by Sir Francis Bolton, that "a system of dual supply is not practicable for domestic purposes, but only for municipal or manufacturing requirements. He alluded to the unfortunate circumstances connected with the dual supply in Paris. Although at ordinary times it might be possible to maintain the distinction between the pure and the less pure supply, it happens the present summer, with the cholera possibly approaching the town, the spring-water is said to be failing, so that nearly all the supply will have to be taken from the Vaune, which is not as carefully filtered and aerated as it would be if it were usually employed for domestic purposes."

Mr. Joseph Quick gave various details with reference to the methods employed for detecting and preventing waste, and incidentally gave the following figures with reference to the extension in London of the "constant" over the "intermittent" system of supply—the number of houses receiving the constant supply being at various dates as follows:

1874.....	59,281	1879.....	138,624
1875.....	70,160	1880.....	160,674
1876.....	75,016	1881.....	185,076
1877.....	97,343	1882.....	203,443
1878.....	122,242	1883.....	226,376

The question of the general introduction of meters was also discussed, and the usual arguments were given *pro* and *con* without coming nearer to a general solution of the matter.

THE LOWER THAMES VALLEY SEWAGE-DISPOSAL PROBLEM.

LONDON, August 20, 1884.

To the Editor of THE SANITARY ENGINEER:

THE article in THE SANITARY ENGINEER of July 10, on the lower Thames Valley sewerage, indicates that the following additional particulars as to the difficulties and obstacles encountered may be of interest.

The difficulties which are encountered by the discharge of sewage into the river Thames, both above and below London, may well serve to warn American cities and towns not to postpone too long the consideration of the important question of the disposal of their sewage. The Thames below London has never been so foul as it is this summer, and expensive temporary measures have been authorized by the Metropolitan Board of Works, even to the extent of employing 140 tons of chloride of lime daily at the sewer-outfalls in Barking Reach.

At the present time much discussion is taking place over the action of a Parliamentary committee in rejecting a scheme for the treatment of the sewage in the lower Thames Valley, which had been agreed upon after some years of study and experiment, and had been approved by the Local Government Board.

The "lower Thames Valley" refers to a district situated above London, and including Kingston, Surbiton, Teddington, Richmond, Hampton, Kew, and some fifteen other suburban places, with a total population of 117,000, which, by the provisions of the Rivers Pollution Act and the Thames Conservancy Act, are forbidden to discharge their sewage into the river without previous satisfactory purification. Up to the present time, however, the sewage has been discharged in its natural state, and the provisional order passed six years ago was extended so that the penalties for non-compliance with the acts were not to be actually incurred until September of the present year. To solve, if possible, the difficult problem of what to do with the sewage, there was created the Lower Thames Valley Main Sewerage Board. Several schemes have been proposed and have either failed to meet the sanction of the Local Government Board or have proved impracticable for other reasons. The scheme which has just been thrown out involved the collection of the sewage from the entire district at a single point (Mortlake), where, after a preliminary straining by passing through a Latham's extractor, the sewage was to be treated in tanks with lime, and subsequently with a mixture of salts of alumina and iron. The mixture was to be thoroughly agitated and allowed to remain at rest for three hours, when the clear liquid was to be drawn off and discharged into the river and the sludge filtered through filter-presses, so that the solid matter would be obtained in the form of a compact, odorless cake. It was claimed by the chemists employed by the promoters of the scheme that the works could be carried on without offense and that a satisfactory effluent could be obtained—an effluent, in fact, as pure as the river in its present condition.

The Committee of the House of Commons appointed to inquire into the scheme has reported that, in its opinion, there was no necessity for the treatment of the sewage in one spot, and that the existence of the Lower Thames Valley Main Sewerage Board acted as a hindrance to the purification of the sewage by the several authorities. It recommends the division of the district into six or eight groups, and the abolition of the joint board.

This action cannot fail to delay the effective solution of the problem for at least two years. Meanwhile it is estimated that the joint board has expended over £60,000 in trying to find a practicable scheme, and that £15,000 or £16,000 has been spent by the promoters and opponents of the scheme which has just been thrown out by the committee.

PRECAUTIONS AGAINST CHOLERA.

A SUGGESTIVE and interesting address on this subject was given before a meeting of the Association of Public Sanitary Engineers in London, August 11, by Edwin Chadwick, C. B., President of the Association, and is published at length as a supplement to the *Press and St. James' Chronicle*. Mr. Chadwick compared the results of the present visitation of cholera with the experience of the English Board of Health in 1848-49, and found that the conclusions then reached were fully verified. Quarantine and disinfectants were futile. Cleanliness and sanitation were of paramount importance. Paris, with readier means for purification, fails to make proper use of them, and has a higher death-rate than London. The latest reports from the Indian Army Sanitary Commission declare that "chol-

era attacks well-defined localities marked by prevailing filth, foul subsoil, cesspits and wells dug in the same subsoil within a few feet of each other, water contaminated by sewage of men and animals, bad housing," and that it moves in two directions—from the Delta to the north-west and north-east, falling like a series of rain-showers, and on a few places only. Out of 480,549 towns and villages in India, deaths from cholera in 1882 were from 47,648 only. The draining and water systems of Calcutta and Bombay have reduced the deaths from cholera to a fraction of the old rate. In military service the losses from disease as compared with losses by the sword are as three to one. The total loss by the sword in India for the last ten years was but one thousand, while the saving of sickness and death by the reduction of the death-rate by sanitary measures was forty thousand, and of money more than five millions.

The loss of capital by the sickness of the wage classes Mr. Chadwick estimates at over twenty-five million pounds—three times greater than the poor rates. Data from mortality tables indicate that every death denotes twenty cases of sickness, every fifth case being that of an adult, and the loss to him of two and a-half weeks' wages—£2 10s. The system of house-to-house visitation, adopted first by English health officers, has been proved the best in epidemics. In Russia, writes Prof. Zedkaur, consulting physician of the Emperor, during the cholera epidemics of 1830, 1848, and 1853, there were in St. Petersburg from 47,000 to 50,000 cases of cholera, and from 23,000 to 25,000 deaths, but in 1866, when the English system of house-to-house visitation was introduced, out of 15,000 attacks there were only 3,000 deaths.

Additional measures recommended by the lecturer were the appointment of local health officers, closer examination into the causes of death, and rigid inspection of schools and workshops. Preventive measures would not now meet with the ignorant opposition of the earlier epidemics, though in one Scotch district the inspector had to contend with a belief that the water had been poisoned, and a suspicion that he had been sent out by the Government to thin the population in that way.

As to the present sanitary condition of London, Mr. Chadwick asserted that the money wasted in ill-judged attempts to restore the "silver Thames," which is now as foul as ever, would have sufficed three times over to have provided self-cleansing pipe-sewers for every street, court, or alley in the metropolis, on the system which has been in use in Edinburgh for fifty years, and is now being introduced into Berlin. Proof was adduced that personal cleanliness is also an invaluable preventive against cholera. At the last epidemic visitation in London, Limehouse suffered severely, but the children of the pauper half-time school there were entirely exempt, owing to the head-to-foot washing with tepid water. Trained nurses take two such baths daily, with complete change of clothes. The colonel of a French infantry regiment, Colonel Louis, has introduced a method by which he gives a superior cleansing with tepid water at a tenth of a penny per head per man. The man undresses, steps into a tray of tepid water, and after being wetted with a spray, soaps himself thoroughly, when, with a two-handled pump, a powerful spray of tepid water washes him from head to foot. In Germany they are advancing upon it in rapidity by arrangements of recesses, in rows, in which men enter in squads, and are submitted to simultaneous douches of tepid water. In fact, the cleansing by the jet has been introduced into Australia for bleaching the fleeces of sheep. They tumble the sheep into tanks of warm soapsuds. They are taken out and a powerful jet of warmed water is directed upon them, when the bleaching is effected, which reduces the weight of the fleece by one-third, at an expense of twopence each. Apparatus on the principle stated ought to be attached to schools for relief from the foul atmosphere of filthy-skinned children, which generates the eruptive diseases, and is particularly needed for the poorer classes of the single-chambered families, who have no convenience for the process. It should be stated, as being proved, that a washed pig puts on a fourth more flesh with the same amount of food that is consumed by an unwashed pig.

Disinfectants and the burning of clothes the lecturer regarded as of minor importance. The subjection of clothes to a heat of 200° kills all life and extinguishes smell. Mr. Chadwick could not remember any instances of the transmission of Asiatic cholera by clothing. In regard to removal to hospitals, it seemed certain that the fatality of pronounced attacks is aggravated by removal to large hospitals. Early removal from the sources of greatest danger

was to be promoted when possible. As applied to the wage classes, Walthamstow was taken as an illustration. There population has increased, but the death-rate has been reduced to fifteen in a thousand, while in urban habitations of the same classes it was from thirty to forty in a thousand. The cause was the suburban situation and effective sanitation.

Correspondence.

SIZE OF SOIL-PIPE TERMINALS.

CHATHAM, ONT., August 5, 1884.

To the Editor of THE SANITARY ENGINEER:

As a subscriber and a reader of your valuable journal I have taken the liberty of troubling you for information relative to the fitting up of a soil-pipe. The usage in this section of country is for the architect to determine as to how the terminals of the pipe shall be arranged. Recently, and contrary to his usual custom, he has deemed it necessary to increase the size of the galvanized-iron pipe from four inches to six inches. You will understand, of course, that the 4-inch cast-iron soil-pipe extends from drain to attic, thence through and about two feet above the roof galvanized-iron pipe. I would like to ask you if there is any advantage gained in the increase of diameter in the pipe from the attic and above the roof. The two pipes are connected by a galvanized taper-joint. One architect's theory is that the galvanized-iron pipe, being so much thinner than the iron soil-pipe, is more susceptible to the vagaries of the weather, and that in winter the vapors, as soon as they reach the thinner pipe, condense and freeze, thereby decreasing, if not entirely stopping, the air-space, and defeating the object for which it was intended. Kindly give me your opinion, and oblige,

Yours truly,
IRA H. LUSCOMBE.

[The object of increasing the diameter of the terminal of a soil-pipe is to reduce the risk of having the end closed on cold nights by the freezing of the vapor that ascends such pipes. In the climate of Canada there is such a risk, and for that reason we should advocate the use of simple open pipes not less than four inches in diameter, and as much larger as experience in that locality has demonstrated to be necessary. The fact of this terminal being wrought or cast-iron is of no practical importance so far as the action of frost is concerned. The latter is, however, the more durable.]

FLOW OF WATER THROUGH SMALL PIPES.

HOT SPRINGS, ARK., September 5, 1884.

To the Editor of THE SANITARY ENGINEER:

I AM having trouble with a hot-water pipe. It is 2½ inches, buried one foot in the ground. The spring it flows from is 1,200 feet away, and eight feet higher than where it discharges. Now, it seems to get air-bound. How am I to remedy it? Yours, A. S. NICKERSON.

[You do not send us sufficient data to enable us to give a definite answer. If there is a constant descent of eight feet in 1,200, we do not see why the pipe should become air-bound. If, however, the pipe follows the inequalities of the ground, it is possible that gas liberated from the water might collect in those portions of the pipe which are practically inverted syphons. The only analysis of the Hot Springs which we have at hand gives no information about the gases present. Possibly the iron pipe has become choked by rust, or by the confervoid growth which is said to occur in the water, and thus a small accumulation of gas might interfere with the flow.

If the pipe is laid on a straight grade from the spring to the point of discharge, there ought not to be any obstruction to a free discharge of about eight gallons a minute.]

Novelties.

TRAP ATTACHMENT.

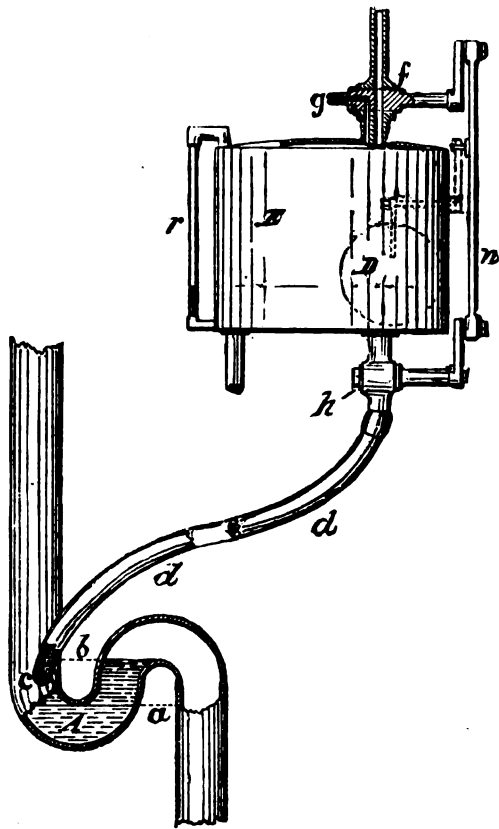
OUR illustration this week shows a novel method for renewing the water-seals in the traps of water-closets and other fixtures, should the same be evaporated or otherwise partly emptied.

It consists essentially of an air-tight vessel, E, acting on the principle that a tight chamber full of water, with but a single opening or pipe at its bottom, and which opening is closed by water in another vessel into which the pipe dips, whereby the first vessel or chamber cannot be discharged of its water without first admitting air into the aperture or lower end of the pipe by lowering the water which covers it. The flow of water from the vessel will then be equal to the amount of air admitted, and will stop again when the opening is covered by the rise of water in the second or lower vessel.

A is an ordinary trap in which *b* is the overflowing water line, and *a* the line at or below which an air-communication

would be established should the water leave the trap. C is a hole in the trap between the regular water-level *b*, and the dangerous level *a*, to which is connected the pipe *d* from the bottom of the vessel E. When the cock *h* is opened and the cock *f* and air-vent *g* closed and the chamber full of water, it is ready for use, allowing water to run into the dip of the trap should the hole C become uncovered.

To fill the chamber E with water, the cock *h* is closed and the cock and air-vent, *f*, *g*, are opened simultaneously by a



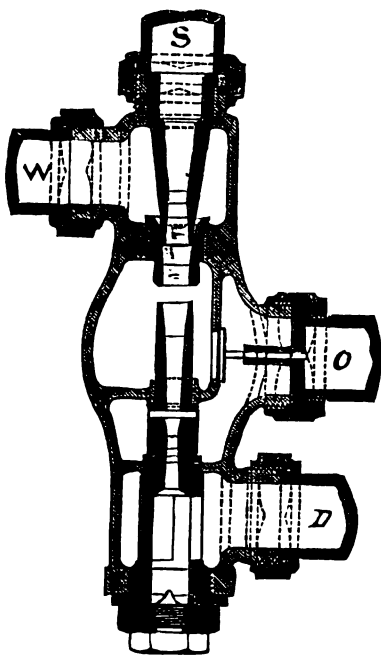
movement of the rod *n*, which connects the two cocks by their respective cranks. In this position the supply of water flows in through the cock and pipe *f*, the air escaping at *g* through another passage in the same cock.

The inventor points out that disinfecting or deodorizing solutions may be used in the chamber.

It is the invention of Mr. Rudolph d'Heureuse, of No. 106 Broadway, New York.

INJECTOR.

THIS illustration is taken from *Iron* and represents one of a new class of injectors which are appearing lately. The special point about them is their readiness to start when steam is turned on—whether quickly or slowly—and to act well, as non-lifters or lifters, when the height does not exceed ten to twelve feet.



In the one under consideration there are no spindles, levers, or moving parts. When at work it is said its action is automatic, and if interrupted by air in the feed-pipe,

splashing water, etc., the stoppage is momentary, and the instrument continues working with steam full on. This feature is peculiar to it, and constitutes its value. The sectional view explains this action. The lift is obtained by dividing the combining-cone into two parts, whereby the steam is enabled to escape with ease. The rush of steam through the upper portion of the combining-cone forms a vacuum in the water-chamber, consequent upon its unobstructed escape through the aperture in the combining-cone and small valve at the side. The vacuum thus obtained exists while steam is on, so that should the injector lose its water it immediately draws it up again and restarts. When at work a vacuum exists in the chamber around the aperture in the combining-nozzle, whereby the valve is drawn on its seat, and held there. Messrs. Holden & Brooke are the inventors, and Messrs. Lewis Olrick & Co., of 27 Leadenhall Street, London, are sole licensees for the south of England.

MEDICAL HISTORY OF THE GREELY SURVIVORS.*

THE *résumé* of the medical history of the cases of the survivors of the Lady Franklin Bay Expedition, just given to the public by Surgeon Edward H. Green, U. S. N., of the "Thetis," who had special charge of Lieut. Greely and three others of the seven survivors, has many points of popular as well as of medical interest. The story begins with the selection of winter quarters near Cape Sabine, on October 25. A house of loose rock and moss was roofed in with canvas, having walls three feet thick; and in this structure, twenty-five feet long, seventeen feet wide, and four feet high, containing only 1,700 cubic feet of air-space (about seventy feet per man), the twenty-five members of the party spent the winter. Two or three were obliged to occupy the same sleeping-bag. The only water obtainable was brackish.

On November 1 the provisions amounted to about forty-six ounces of solid food per man for forty days. It was agreed to divide them so as to make them last until March, reserving ten days' supplies with which to attempt the trip to Littleton Island. This gave but 14.88 ounces per day, of which 6.5 ounces was bread and dog-biscuit, 4.33 ounces meat and blubber, and the rest canned vegetables, rice, butter, lard, soup, and beef-extract, berries, pickles, raisins, and milk. About 500 pounds of meat from game killed during the winter was added. On March 1 another reduction was made in rations, the straits not being frozen and the attempt to cross to Littleton Island impracticable. Of meat 6.8 ounces, of bread and dog-biscuit 3.2 ounces were issued daily, other stores being exhausted. A crustacean, called the shrimp or sea-flea, was a slight addition to the meagre ration. The party, already diminished by the death of Sergeant Cross through scurvy, and of Hans, the Esquimau hunter, by accident, now began to weaken and die off rapidly. About March 24 the whole party was nearly asphyxiated, having omitted to open the vent-hole in the roof after lighting the alcohol stove to cook a meal. With the greatest difficulty they reached the open air, where many were frost-bitten.

About May 12 the provisions were exhausted. Thereafter the sole food was reindeer-moss—gelatinous matter procured by boiling the sealskin linings of the sleeping-bags—and the little shrimps (an eighth to a fourth of an inch long and four-fifths shell). The living temperature of the hut was from 5° F. to 10° F. Only the cooks and hunters stirred about much, the rest sleeping nearly three-fourths of the time. There was little acute suffering from lack of food, except immediately after the introduction of food into the stomach, the chief suffering being from constipation. The deaths are described as seeming to take place from heart trouble (*hydrops pericardii*); the feet and face became œdematous; for a day or so the individual would complain of pains over the heart, have a spasm of pain over præcordia, a slight general convulsion, and all would be over.

Of the seven survivors discovered at the camp, one, Morris Connell, private, is described as having been actually *in extremis*, and the condition of all was so desperate that a delay of two hours was necessary before they could be carried to the boats. Brandy, milk, and beef-essence were administered.

As symptoms and treatment closely resembled each other in all the cases, Dr. Green confines his detailed account to

* The paper from which the facts in this article are extracted was printed in the *Medical News* of September 6, and announced as specially prepared for that journal by Surgeon Green. The same paper appears in the *Boston Medical and Surgical Journal* of September 4.

the case of Lieut. Greely. Some of the main points are as follows:

On being admitted to the ward-room (June 22, 11 P. M.) he fainted and vomited; ammoniac spts. aromat. 6 c. c. (100 minims) was administered, renewed in ten minutes; teaspoonful of raw fresh beef, minced; clothes cut away and heavy red flannels, warmed, substituted. On examination it was noted that a sickly, offensive odor was emitted; face, hands, and scalp were blackened with thick crust of dirt and soot (not having washed or changed clothing in ten months); body emaciated, skin hanging from limbs in flaps; mind excitable and irritable, almost irrational; eyes wild and staring; patient insisted on talking and demanding food; tongue dry and cracked, with heavy brownish-black coat; ravenously hungry; abdominal cavity hollow; no stool for six days; liver dullness in right hypochondriac region; respirations, 12 per minute; no abnormal condition of lungs; vesicular murmur puerile; pulse 52, soft and compressible; marked murmur (blowing) in systole over base of heart; skin cold and clammy, shriveled and sallow; temperature under tongue 97.2°; great muscular waste, patient unable to stand or move without support; weight 120 pounds, as compared with 168 before leaving Fort Conger, August, 1883.

The treatment at first was simply a teaspoonful of minced raw beef alternated at half hours with one of milk-punch. On the 23d a raw onion was added, finely cut up; no medication. The mind was still active and restless; talk rational, but showing some loss of memory. The weakness, coated tongue, and offensive odor continued; pulse 60, respirations 12, temperature 97.8° to 98°. On the next day a little oatmeal was given in the morning, and Liebig's beef-essence in hot water every four hours, scraped beef and onion continued; sponging with tepid water and flannels; no medication. The mind was more tranquil, but active, pulse 62, temperature 97.6° to 98°, tongue moister. A microscopic examination of blood showed a large increase of white corpuscles; the nucleated corpuscles were in proportion of about one to twenty red; heart sounded stronger, but anæmic murmur still pronounced; muscles sore. On the 25th Lieut. Greely had two or three hours' natural sleep, and awoke refreshed, with more tranquil mind; pulse 65, respiration 14, temperature 98.2° to 98°. The muscles were shampooed with dry cloths. No change in diet. The next day (26th) he was allowed to sit up and read; slept soundly six hours; mind tranquil, but a loss of memory of words; pulse 65, temperature 98° to 98.8°; tongue cleaning; heart stronger, murmur still pronounced. Medicine was given for the first time (tr. ferri muriat., 5 c. c. 80 minims, three times a day). On the 27th, though still very weak, there was some improvement; voice stronger; mind easier; appetite morbid; amnesic aphasia marked; muscles filling out, but very soft; eight ounces of broiled steak allowed; iron continued. On the 28th there was a gain of strength and general improvement in symptoms. Food in small quantities was given at five intervals, consisting of oatmeal, broiled steak, beef-essence, a soft-boiled egg, and minced beef and onions. The following day the patient was aided to walk a few steps, still very weak. Weight had gained 9½ pounds in the week. From this time, the 25th, the improvement was gradual but constant, though for two weeks the greatest care was necessary. The treatment was mainly in careful dieting, occasional slight stimulants, and iron. The latter soon caused a decrease in the white corpuscles; the anæmic murmur gradually disappeared; the muscles filled out and hardened; the action of the bowels and urinary system became more regular and natural, and on the 19th Lieut. Greely was allowed to go on shore for exercise at St. Johns. A slight attack of intestinal indigestion followed an error in diet on the 19th, but by the 25th three full meals were allowed, with certain articles restricted. The damp weather on the voyage to Portsmouth brought about prostration, which was treated by quinine sulph. (27 grs. nightly). At Portsmouth Lieut. Greely's weight had risen to 169 pounds, a gain of 49 pounds in six weeks, the greatest gain being 15 pounds in the second week. In relinquishing charge of the cases, Surgeon Green, as a result of the careful medical care and assiduous attention given the survivors, was able to report all as in fair or good physical health, and free from organic disease, though the results of their terrible suffering had not entirely disappeared.

TYPHOID FEVER has been very prevalent in Zurich, Switzerland, a city of 83,000 inhabitants. The disease has been characterized by severe complications. One of the causes is thought to have been the low water in the lake.

Reviews of Books.

SECOND ANNUAL REPORT OF THE HEALTH DEPARTMENT OF KANSAS CITY for the year 1883. 60 pp. 8vo.

Dr. John Fee, the City Physician and Sanitary Superintendent of Kansas City, commences this report by calling attention to the defects in the registration of the vital statistics of the city, which defects are sufficiently evident from the fact that the registers would make it appear that the death-rate of the city for the year was only 13.21 per 1,000, and the birth-rate, 10.90 per 1,000. Dr. Fee rightly insists on the importance of this subject, saying that "in the increase or decrease of the death-rate are shown the neglect and unfaithfulness or the skill and industry of the Sanitary Superintendent and his subordinates, the cleanliness of streets, the fitness for habitation of tenement-houses, the municipal control in all that pertains to sewerage, plumbing, school hygiene, etc."

Certainly it is impossible for a health officer to carry out scientific sanitary work, to direct his efforts to those points where they are most needed, unless he can locate the leaks through which the health and life of the community which he serves are being wasted, and he cannot locate these leaks unless he is promptly informed of the locality and cause of every death.

The amount of epidemic disease in the city during the year appears to have been small. There were nine cases of small pox and two deaths therefrom. Isolation appears to have been promptly and effectively practiced, and to this and vaccination is due the fact that the disease did not spread. Dr. Fee gives copies of the papers relating to sewerage, published in the reports of the State Board of Health of New York and of the State Board of Health of New Jersey for 1882, and gives as his opinion that the first, by Mr. J. T. Gardiner, "is a partisan argument for the Memphis system," and that the second, by Mr. J. W. Adams, is "a dispassionate criticism and discussion of the whole subject of sewerage."

With reference to the inspection of meats, he remarks that the flesh of maimed and diseased animals is sold in the city, and that he found four animals affected with "lump jaw" in a pen of animals collected for slaughtering; by "lump jaw" is probably meant actinomycosis, a very dangerous parasitic disease which has been communicated to man, and against which special precautions should be taken in the interests of both veterinary and human hygiene.

His remarks on milk inspection, on the public schools, and on the necessity for a sanitary code are wise and timely, and should receive prompt attention.

CITY OF LIVERPOOL. Return as to causes of fever, etc. Report of the City Engineer. 97 pp. 8vo. Liverpool, 1883.
CITY OF LIVERPOOL. Causes of fever and other zymotic diseases in the city. 48 pp. 8vo. Liverpool, 1884.

The Health Committee of the City of Liverpool seems to be in earnest in its desire to improve the condition of the city, which, from a sanitary point of view, has long been unsatisfactory, and in particular to have given attention to the subject of the prevalence of contagious typhus in certain localities. The term fever, as used in these reports, which were prepared by order of the Health Committee, includes typhus, typhoid, and relapsing fevers, which are probably quite distinct diseases, and are caused by quite distinct poisons. Typhus is the prevailing fever in Liverpool. The great predisposing cause of typhus is air polluted with animal exhalations. Its favorite haunts are in overcrowded localities, where there is defective ventilation. Whether it can be produced *de novo* by overcrowding and filth is not certain, but is fairly probable. At all events it is certainly contagious, and it is by contagion that it is spread, whatever may be the origin of the first case. It is conveyed through the air, and by clothing and bedding. It is most contagious after the first week; when the patient is isolated within this period the disease rarely spreads.

Dr. Taylor says: "The class of people among whom typhus fever spreads most rapidly are those whose constitution is enfeebled by prolonged want, insufficient clothing, filthy personal habits and surroundings, or by intemperance. It is, moreover, people of this class who are most prone to overcrowd the dwellings of the worst kind, and the fetid atmosphere which results from the crowding together of squalid human beings, constitutes another most important factor in the propagation of the disease."

"But it must be remembered that the disease, being an eminently infectious one, may and does attack those who are exposed to it, irrespective of their general social surroundings; indeed, the great and continued prevalence of typhus fever in this city, though contributed to by the con-

ditions mentioned above, is mainly owing to its infectious character.

"It is desirable to point out one or two of the principal points in connection with the infectiveness and mode of dissemination of the disease:

"When all the members of a family are equally exposed to infection, the children will be the first to be attacked. Adults, especially if they be in good health, may resist infection even for many months.

"The mortality appears to be almost inversely as the susceptibility to the disease. Among children the percentage of mortality is fractional; among adults it is extremely high.

"When a person is infected, a certain definite period (usually ten days) elapses before any symptoms of illness manifest themselves. During this period of latency the infected individual is not himself at all infectious, and only slightly so, if at all, during the earlier days of his illness. But from about the seventh day of the fever onward to the end of the third week of his illness he becomes eminently infectious, and especially dangerous to those about him, if he be kept in a small or ill-ventilated room. If, however, the sick person be removed to hospital during the first seven or eight days of illness, the risk of infection will be obviated."

The report of the Health Officer is well illustrated by maps showing the localities in which fever has prevailed, and also the overcrowding in certain streets. A study of some of these maps and of those given in the report of the engineer will give a better idea than can be conveyed by any mere verbal description, of the small amount of free-air space uncovered by buildings which exists in some of the unhealthy localities.

Nevertheless, the tables presented by the Medical Officer show that more cases of fever have occurred in houses fronting on a street than in cellars or in houses fronting on closed courts, and the mortality of court houses is less than that of front houses.

His explanation of this unexpected result is that as regards ventilation the front houses are not superior, as they are nearly all set back to back with other buildings, and that in such front houses the earliest cases of disease were not so readily discovered. "Unless a death occurred it was probable that the case would not be reported. The first case of fever occurring in a house is generally that of a child, which, if in a court house, is removed to hospital, where it recovers and the disease is stamped out; but in a front house medical assistance is generally sought, and the child recovers after infecting other members of the family." We do not think that the treatment of typhus by medical officials is so superior to its treatment by average physicians as Dr. Taylor would infer. The apparently higher mortality in the better class of houses is due to the fact that while every case of death is reported, the milder cases are not, while in the poorer houses, cellars, etc., every case is reported.

The chief criticism which we have to make on Dr. Taylor's report is that it lays too little stress on the necessity for reconstruction of buildings so as to permit free circulation of air, which is the only permanent remedy for contagious typhus. But he probably felt that what was wanted was that which could be done by immediate action, and his report is certainly very interesting and instructive. The report of the City Engineer, Mr. Dunscombe, giving the results of detailed inspection in certain parts of Liverpool, is also a valuable one, though rather of local than general interest.

TENTH ANNUAL REPORT OF THE MEDICAL OFFICER OF HEALTH TO THE URBAN SANITARY AUTHORITY OF THE CITY OF WORCESTER [England], 1883. 30 pp. 8vo.

The interesting part of this report is that which relates to the progress of sanitary improvement in the city since the organization of a health department under the Sanitary Act of 1872, and the appointment of the Health Officer, Dr. William Strange who presents this as his tenth report. The survey of the city in 1872 showed that it contained a large number of courts and narrow alleys, the abode of 3,145 persons. There were 108 wells in use, most of which were polluted, and there were 1,847 open privies and cesspits, most of which were in a foul condition. At present the number of inhabitants of courts and narrow alleys is something under two thousand; almost all the wells have been closed, and water-closets have to a great extent taken the place of privies. The average annual death-rate for the five years 1874 to 1878 inclusive, was 24.30; for the five years 1879 to 1883 inclusive, 20.72 per thousand. In the first five years there were 139 deaths from scarlet fever, 15 from diphtheria, 55 from typhoid fever, and 281 from diarrhoea.

In the second five years, with a larger population, there were 28 deaths from scarlet fever, 6 from diphtheria, 47 from typhoid fever, and 209 from diarrhoea.

The present population of the city is about 34,000. The death-rate among infants under one year of age is high, being 146 per thousand of births, or a little greater than the same rate in London—*i. e.*, 144.

A mild form of typhoid fever has been prevailing, the cause for which does not seem to have been made out.

Upon the whole Worcester does not seem to be in as good sanitary condition as a city of its size should be, for its death-rate should not exceed 18 per thousand annually, but it has made decided improvement within the last ten years, and it is to be hoped that it will keep on in the same direction.

BURGH OF DUNDEE. Annual Report of the health of the Burgh by A. M. Anderson, M. D., Medical Officer of Health. Also Report on the Operations of the Sanitary Department, by Thomas Kinnear, Sanitary Inspector. Year 1883. 52 pp. 8vo.

During the year 1883 the number of deaths registered in Dundee was 3,533, representing an annual death-rate of 23.91 per 1,000, calculated on an estimated population of 147,766. Only three large towns in Scotland had a higher death-rate. The number of cases of infectious disease reported during the year was 897, including 70 of typhus fever, 279 of typhoid, 392 of scarlet fever, and 117 of diphtheria. "All the cases were duly reported by the medical attendants and the householders. The total number reported by the former was 848, and there were 22 cases reported by householders alone in which there was no medical attendant. In Dundee the system of notification of infectious disease has proved an unqualified success from the first; there has been no friction or complaints, and since the 10th of August, 1882, I have only heard of two cases of alleged concealment of disease. I believe one of the reasons of this success is the royal and thorough way in which the medical practitioners of the Burgh have fulfilled their obligations under the act; probably also the line of action pursued by the Sanitary Department, in strictly exacting from every householder the fulfillment of his legal obligation to report, independently of the medical attendant's report, has suppressed the public feeling so frequently referred to in other large towns. Where every householder must report the presence of infection in his household, he has no ground of complaint because his medical attendant does likewise."

The sum paid to the medical practitioners was £99.0s. 6d., there being 755 certificates at 2s. 6d. each, and 93 at 1s. each. * * * During the year there were two outbreaks of infectious disease, which illustrate in a forcible way the great advantages conferred on the community by the additional powers obtained in the "Dundee Police and Improvement Consolidation Act, 1882." In the first, in September, 17 cases of scarlet fever, resulting in 4 deaths, occurred among the customers of a dairyman who had failed to report the presence of infection in his own household. The officers of the department speedily traced out the source of infection, and took measures under the act which effectively stamped out what might have developed into a wide-spread and fatal epidemic. The second outbreak, in October, was much more serious, and resulted in 132 cases of typhoid fever for that month. Of this number 87 cases occurred among the customers of a dairyman whose milk was infected. In virtue of the powers conferred by the act, the Sanitary Department was enabled to suppress this formidable outbreak in the short period of 22 days, and but for some obscurity as to the origin of the infection, it could have been suppressed at the commencement. * * * As every case of infectious disease, as defined in the Act of 1882, was known to the Sanitary Department, it is interesting to observe the proportion of deaths to the number of cases. In typhus fever, 1 in every 7 died; in typhoid fever, 1 in 11.6; scarlet fever, 1 in 30.15; and diphtheria, 1 in 2. During the year the percentage of deaths among those removed to hospital was 9.47, while among those treated at home it was 15.27—a difference of nearly 6 per cent. in favor of hospital treatment. It must be said, however, that the difference is partly accounted for by the fact that nearly all the cases of diphtheria were treated at home, but notwithstanding that it remains conclusively proved that the mortality among the persons treated in overcrowded private houses was very large. Of the 73 cases which occurred in one-roomed houses, 32 were removed to hospitals, and 3 of these died, or 1 in 10; but of the 41 cases treated at home, 9 died, or 1 in 5; that is to say the mortality in the latter cases is double the death-rate among those removed to the hospital.

The report is accompanied by some carefully prepared and interesting statistical tables.

FORTY-FIFTH ANNUAL REPORT OF THE REGISTRAR-GENERAL OF BIRTHS, DEATHS, AND MARRIAGES IN ENGLAND. (Abstract of 1882.) 254 pp. 8vo. London, 1884.

If each State in the United States kept such records as those which are summed up in this volume, and published such tabulations as these, their value in a political and sociological aspect would be very great, while as a foundation for sanitary effort they would be invaluable. But we have no such records, and can therefore only make use of the deductions drawn from those of our friends across the Atlantic, though we are very uncertain as to how far these apply to our own circumstances. At all events, let us be thankful that there are some countries which are willing to do this work. From the report now before us it appears that in England in 1882 there were registered 889,014 births, giving a birth-rate of 33.7 per 1,000. This is the lowest birth-rate recorded since 1853, when the rate was 33.3. The male births numbered 452,752, giving 103.8 male births to 100 female. The illegitimate births numbered 43,155, or 4.9 per cent. of the whole number registered.

There were 516,654 deaths registered during the year, giving a death-rate of 19.6 per 1,000 of living population.

A comparison of the death-rates in children from five to fifteen years of age for the periods 1861-70 and 1871-80 is given in answer to the question whether the present system of school education is injurious to health. From this it appears that the general death-rate of this group of ages in 1861-70 was 6.3 per 1,000; in 1871-80, 5.1 per 1,000—a decline of 19 per cent. This diminution in mortality occurred chiefly in the zymotic diseases. On further examination it appears that no part of this lowering of the death-rate occurred in diseases of the brain and nervous system, the proportion of deaths from these causes remaining about the same.

The death-rate in the residents of cities, consisting of about 15,500,000 people, was 21.1, while that of the rural population, comprising some 10,500,000, was 17.2. It is remarked that "in comparing the urban and rural mortalities with each other, it is important to remember that the age and sex distribution differs widely in the two populations, and that the differences tell largely in favor of the urban population, which contains a much smaller proportion of aged persons and a much larger proportion of persons in the prime of life, as also a much larger proportion of females, than does the rural population; and that, though these favorable conditions are somewhat counterbalanced by there being in towns a larger proportion of younger people, whose mortality is always high, yet this disadvantage is by no means an equivalent for the above-mentioned disadvantages."

The Registrar-General again appeals to medical practitioners, asking them to use greater care and precision in stating the causes of deaths in their certificates. This is an appeal which will meet with hearty sympathy from our own registrars.

But, as an Ohio statesman once remarked in commencing a speech, "it is pretty impossible for one man to convey to another ideas of which he is not himself possessed."

CITY OF LIVERPOOL.—LABORERS' DWELLINGS.—REPORT OF THE CITY ENGINEER. Liverpool: H. Greenwood, 1884.

This report, by Mr. Clement Dunscombe, C. E., presents a series of designs for dwellings in blocks and self-contained cottage-houses, based on the lowest scale of rental—*viz.*, one shilling per room per week.

Lithographed plans are also given, showing some existing courts which are being dealt with by the authorities, and indicating better than could be done by pages of description the overcrowding which is so serious a problem in certain parts of the city.

Mr. Dunscombe was instructed by the "Insanitary Property Committee" of the City Government to report as to the best examples of buildings erected for the accommodation of the poorer classes at the lowest scale of rental, and in accordance with this he states that the later buildings erected by the Peabody trustees in London, and those now being erected for the Liverpool Corporation at Nash Grove, are, perhaps, the best examples, but that none of these approach a rental within the reach of the poorest laboring-classes. Some dwellings in Holt Town, Manchester, are referred to as approaching more nearly the requirements as to rental, and are described as detached three-story block dwellings, in flats, consisting of two rooms each, let at 2s. 6d. per week, and costing £78 per flat, exclusive of land.

The designs submitted for dwellings at a rental of one shilling per room per week provide in case of a single bed-

room not less than 1,000 cubic feet of space, and where a tenement consists of three rooms, the two bed-rooms are to contain, respectively, not less than 1,000 and 750 cubic feet.

All the tenements are provided with a separate water-closet, sink, water for domestic purposes laid on, a ventilated cupboard, coal-bunker and dust-shoot.

The designs will be found interesting, not only by architects and builders, but by all who are interested in the housing of the poorer classes in large cities.

REPORT OF LONDON SANITARY COMMITTEE, WITH THE HALF-YEARLY REPORT OF THE MEDICAL OFFICER OF HEALTH. For the half-year ending Christmas, 1883. 33 pp. Folio.

The essential part of this document is the report of Dr. William Collingridge, the Medical Officer of Health of the Port of London. He reports one case of true cholera as having occurred on a vessel coming from Suez, but no evidence is given as to the nature of the case. His remark as to the objectionable and unwise practice of sending home the effects of persons who have died from cholera—*viz.*, "undoubtedly the shipment of such clothes, unless disinfected and accompanied by a certificate to that effect"—is timely and sensible. His statement that the disease was, without doubt, endemic in Egypt shows that he is a very bad judge of evidence.

A considerable quantity of unsound meat was discovered and condemned. This included frozen carcasses and tinned meats.

The average number of merchant vessels present on the river is found by a count to be from 2,500 to 3,000, containing a floating population of about 22,000. Of 14,043 vessels inspected, 99 contained foul cargoes, and 725 were ordered to be cleaned or whitewashed. Of the 14,043 vessels inspected, only eight were American.

If these inspections are carefully made, and the results properly reported, the Medical Officer of Health of the Port of London should be able to present an exceedingly valuable report upon the hygiene of the merchant marine of the world, as illustrated by the conditions actually found in the course of several years' work, and it is to be hoped that he will do this.

WE take from the *Vierteljahreschrift für öffentliche Gesundheitspflege* the following table of the result of the inspection of hog products in Hamburg for the last six years:

Number of Examiners	1878	1879	1880	1881	1882	1883
	17	91	108	60	48	51
American Hogs	35,510	79,864	54,008	42,405	13,507	8,332
Hams	14,003	28,749	19,877	23,821	5,112	4,983
Various	49,513	102,602	78,897	73,113	18,619	16,118
European Hogs	10,638	16,204	9,013	15,107	15,469	16,118
Hams	27,113	28,710	39,040	39,570	41,073	45,672
Various	222	739	14	1,020	1,043	1,026
Total	28,173	47,247	49,943	55,799	60,527	69,936
Grand total	77,686	149,909	128,840	128,912	79,146	76,251
Per Cent. Trichinosis:	0.79	1.16	1.05	0.95	0.95	0.69
American	0.01	0.006	0.00	0.004	0.00	0.00
European	385	1,293	836	697	175	92
Found Trichinosis	385	1,293	836	697	175	92

THE House of Commons has rejected by a decisive majority the bill licensing crematories.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING SEPTEMBER 6, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping-cough.																							
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.																											
NORTH ATLANTIC CITIES.																																															
Portland	Maine	35,000	16	23.8	9	56.2	1		3		5											1		12																							
Boston	Mass.	435,000	228	27.3	121	53.0	7	1	35		60	6		5	2	4																															
Lowell	Mass.	71,500	35	25.5	16	45.7	1		5	1	7		1	1	1	2		1																													
Worcester	Mass.	69,000	31	23.4	18	58.0			6		11	1			1	1																															
Fall River	Mass.	67,000	40	31.1	27	67.5			5		17					1		2		1																											
New Haven	Conn.	69,500	23	17.2	8	34.7			2	1	2	1		2		2		1																													
Providence	R. I.	125,000	46	19.1	28	60.8			4		17			1				1				1																									
Total		872,000	419	25.0	227	54.1	8	2	62	2	125	8	1	9		3	10	1	5		1	2		13																							
EASTERN CITIES.																																															
Albany	New York																																														
New York	New York	1,355,000	655	25.1	345	52.6	20	2	103	9	156	9		18	4	8	31		15		8	6		16																							
Brooklyn	New York	670,000	353	27.4	201	56.9	10		35	4	105	5	2	4	10		11	2	10		2	1		14																							
Hudson County	New Jersey	225,000	57	13.1	21	36.8			10		12	1		1		1	3		1																												
Newark	New Jersey	154,000	64	21.6	33	51.5	2	2	6	1	11	2					2	1						2																							
Philadelphia	Pa.	940,000	386	21.3	152	39.3	16	15	46	7	25	13		15	1	4	12	2	1	2			1	4																							
Wilmington	Delaware	50,000	20	20.8	8	40.0		1	3		3			1		1																															
Total		3,394,000	1,535	23.5	760	49.5	48	20	203	21	312	30	2	39	15	14	59	5	27	2	10	7	1	36																							
LAKE CITIES.																																															
Buffalo	New York																																														
Rochester	New York																																														
Cleveland	Ohio	210,000	95	23.5	58	61.0	3		13		30	5		1	1		2	2	2		2			4																							
Detroit	Michigan	140,000	62	23.0	32	51.6			2	1	14	2		1	1		1	1						2																							
Chicago	Illinois	650,000	251	20.1	147	58.5	18	1	14	2	65	10		10	1	3	7	2	3		8			5																							
Milwaukee	Wisconsin	147,000	74	26.2	54	72.9			3		27			2		3	4		1	1				1																							
Total		1,147,000	482	21.8	291	60.3	21	1	32	3	136	17		14	3	6	13	5	5	1	11			12																							
RIVER CITIES.																																															
Pittsburg	Pa.	210,000	78	19.3	45	57.6	7		6			5		7		1					1			1																							
Cincinnati	Ohio	275,600	116	21.9	47	40.5	3	1	14	2	13	2		3		1	5	1																													
Louisville	Ky.	137,000	48	18.2	19	39.5			7		3			3		1	2	1			2																										
Indianapolis	Ind.																																														
Minneapolis	Minn.	100,000	53	27.6	24	45.2	1		3	1	12	4		8	1		1				1			2																							
Evansville	Ind.	34,000	21	32.1	8	38.0	8		1		5																																				
St. Louis	Mo.	375,000	151	20.9	58	38.4	9	3	17	2	20	4		6	5	1	6	2			1			1																							
Total		1,131,600	467	21.5	201	43.0	28	4	48	5	53	15		27	6	3	14	4			1	4		4																							
SOUTHERN CITIES.																																															
District of Columbia	Wh.	133,800	46	17.9	18	39.1	2		6		7			2		2			1			1		2																							
	Col.	69,800	47	35.3	30	63.8	4	1	4					1	2	1		1					1																								
Richmond	Va.	41,000	12	15.2	10	63.3					1			1						1																											
	Col.	32,100	28	45.0	12	42.8			2		1			3	1				1																												
Charleston	S. C.	25,000	11	22.9	3	27.2		1	1		1	1	1																																		
	Col.	27,800	17	31.8	6	35.2			3	1	2				2																																
Atlanta	Geo.	30,000	12	20.8	6	50.0	2				5			1																																	
	Col.	20,000	16	41.6	13	81.2	1		1		7						1							2																							
Augusta	Geo.																																														
	Col.																																														
Savannah	Geo.																																														
	Col.																																														
Nashville	Tenn.	35,100	9	13.3	4	44.4			1		2	2		1				1																													
	Col.	21,300	5	12.2	1	20.0					1			1																																	
New Orleans	La.	171,000	83	25.2	26	31.3	4		8		6	2		4	15	1	1		1					1																							
	Col.	63,000	48	39.6	15	31.2	2	1	4	1	6				7		2		1			1	2																								
Total White		435,900	173	20.6	67	38.7	8	2	16		24	5	1	9	16	3	1	1	2																												
Total Colored		233,800	161	35.8	77	47.8	7	2	14	2	24	1		5	12	1	3	1	2		1	1	2	3																							
Total in 29 U. S. Cities		7,214,300	3,237	23.3	1,623	50.1	120	31	375	33	674	76	4	103	52	30	100	17	41	3	24	15	3	71																							
August 23. Total in 28 English Cities																								8,762,354	4,293	25.6			118				995	24		53		67					71		27	77	
" 23. " 8 Scottish Cities																								1,254,607	524	21.8			19				74	13		6		14					6			28	
" 23. " 16 Irish Cities																								858,660	405	24.5			4			68		49	2		3		21					43			6
" " 139 German Cities																																															
" " 15 Swiss Cities																																															
" 23. " 15 Swiss Cities																								455,537	190	21.7			8			35		52	4		8							1	1	1	3

DENMARK.—*Copenhagen*.—August 12-19: Deaths, 134; annual death-rate, 26.1 per 1,000. Measles caused 7 deaths, whooping-cough 6, typhoid fever 1, diarrhoeal diseases 38, consumption 5, and violence 5.

THE LATE ROBERT HOE.

THE death of Robert Hoe, of the well-known firm of R. Hoe & Co., manufacturers of printing-presses, has a special interest to our readers, as Mr. Hoe took an earnest and intelligent part in matters relating to sanitary reform. Mr. Hoe was a native of the city, but his father, who was the founder of the firm, was born in Leicestershire, England, coming to this country over eighty years ago. The immense establishment founded by the father was carried on after his death by Robert and his elder brother Richard, and grew to be the largest manufactory of printing-presses in existence. The death of Mr. Hoe took place on Saturday, September 12, at his residence in Tarrytown, after a long illness. He leaves a widow, a son who bears his father's name, and a daughter.

Besides his prominence as a business man, Mr. Hoe was well known as a public-spirited citizen, interested in all important municipal and charitable undertakings, and notably liberal and judicious in his benefactions. He was a member of the Fifth Presbyterian Church of this city. When the Committee of Seventy was instituted and began its warfare on the corrupt political rings of New York, he became one of its most influential members. In addition to his business and benevolent qualities, Mr. Hoe was well known as an admirer of art and an encourager of young artists. He was one of the founders of the National Academy of Design, and a member of the Century Club. Our readers will remember that Mr. Hoe served as one of the judges in THE SANITARY ENGINEER Tenement-House Competition of 1879.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Sept. 13.....	24.56	19.02	22.58	28.45	29.31	19.06

E. G. LOVE, Ph.D., *Gas Examiner*.

It is proposed to hold a gas and electric-lighting exhibition at Brussels next year.

It is reported that the Municipal Gas-Works at Prague are lighted by the Pilsen arc-lamps.

THE Reading (Pa.) Electric-Light Company has reduced prices to \$10 per month for the year on the 9.30 circuit, and \$12.50 on the 12 o'clock circuit.

THE central station of the Edison Electric-Light Company in Berlin is to have four 500-light Edison dynamos, with a capacity for lighting 2,000 16-candle-power lamps.

THE report of the Manchester Corporation Gas Committee for the nine months ending with March last shows an increase in the output of gas at the rate of 4.76 per cent. per annum. The unaccounted-for gas is 10.28 per cent.

ACCORDING to *Nature*, an experiment was recently made in Vienna consisting in surrounding an incandescent electric-lamp with paper. On lighting the lamp by the current the heat generated was sufficient to ignite the paper, which burned out and exploded the lamp.

AN incandescent gas-burner has recently been patented, which consists of a number of small pencils of magnesia placed in suitable sockets and suspended over the burner. The heat required to render these pencils incandescent is to be obtained by the combustion of a mixture of water, gas, and air.

THE Chief of the City Electrical Department of Philadelphia, Mr. D. R. Walker, has notified the telegraph, telephone, and electric-light companies that all wires must be removed from the streets before January 1, and plans for underground conduits and lines submitted before December 1, in accordance with the ordinance of June, 1882.

MR. T. TRAVERS, in a paper on the "Comparative Advantages of Dry and Wet Gas-Meters," read before the Gas Institute, considers that the advantages of the wet meter are that it is simple, durable, and reliable as a measurer,

while with the dry meter the advantages lie in its being more convenient, cheaper, and requiring less attention. He prefers the wet meter, however, for the reason that it measures more accurately.

AT Old Cumnock, Ayrshire, the Roman Catholic Church of St. John, built by the Marquis of Bute, has been fitted with seventy glow electric-lamps of 20-candle power each, under the superintendence of Mr. William Massey, of Twyford, electrical engineer to the royal palaces. The dynamo and steam-engine are placed in a small building in the church-yard, and will furnish power also for the working of the organ-bellows.

THE *Journal of Gas-Lighting* gives a description of the Schulke recuperative gas-lamp which was exhibited at a recent meeting of the Société Technique de l'Industrie du Gaz en France. The burner is said to give the light of 9.6 carrels for a consumption of 300 litres of gas per hour, or about nine candles per cubic foot. The smallest size of this burner is 34-candle power, and the largest 1,425-candle power. The recuperator consists of platinized sheet-iron, and the burner is made up of a number of fishtail or batwing-tips placed at the bottom of the burner and surrounded by a glass globe.

Notes.

CONSTRUCTION.

WASHINGTON, D. C.—Contracts for laying sewer-pipes have been awarded to F. P. Murphy, 12-inch pipes at \$1.03 per lineal foot; 24-inch pipes at \$1.49 per lineal foot. To John Cudmore, 15-inch pipe at \$1.07 per lineal foot. To Owen O'Hare, construction of twenty receiving-basins, more or less, and pipe-connections, at prices aggregating \$1,385. Other bids opened August 16, and not yet awarded, are rejected, and the work will be readvertised—viz., bids for 18-inch sewer-pipe and for 2'x3', 2½'x3', and 75'x3' brick sewers.

WASHINGTON, D. C.—The contract for the new school building on S Street, between Thirteenth and Fourteenth, has been awarded to Frank Baldwin, of this city, work already begun, to be completed by June 20, 1885. The contract for heating by steam is embraced in the general contract, and has been awarded by Baldwin to William E. Wood & Co., of Baltimore. The drainage and plumbing-work will be done by R. Bond, of this city. The cost will be \$44,000, and John H. Bird will superintend the erection of the building, under the Inspector of Buildings. The Inspector of Buildings has been instructed by the Commissioners to prepare plans for two new school buildings to be erected from the funds to be derived from the sale of the Holmead burying-ground. One will be located in East and the other in West Washington. These buildings will be heated by hot-air furnaces.

W. H. HOUSTON & Co. have received the contract, at \$6,000, for the plumbing of the Mercy hospital, Pittsburg Pa.

ALACHUA COUNTY, FLORIDA.—Bids for building the court-house were opened September 8 and contract awarded to Messrs Murphy & Roberts, of Waycross, Geo., for \$31,000. The next lowest bid was \$47,000.

CLEVELAND, O.—The Board of Improvements on September 8 gave contracts for sewer building as follows: Wood Brothers, for sewer on Minnesota Street, from St. Clair to Superior Streets, \$46,200; on Chestnut Street, \$1,003.50; between Dodge and Ross Streets, \$1,273; on Sibley Street, \$251.20; on Franklin Avenue, \$653.50. Clement Brothers, for sewer on Fairfield Street, \$677.50.

THE Thippler Bridge-Works of Pittsburg has the contract for erecting the Machinery Hall of the New Orleans World Exposition. It is to be of iron, 400 feet long and 120 feet wide. Much of the iron will be taken from the stanchest left of the main Centennial Exposition building. The building must be completed by November 1.

WASHINGTON, D. C.—Mr. Richardson, of Boston, is the architect of the two houses now building at a cost of about \$100,000, on Sixteenth and H Streets, for Col. John Hay and Mr. Henry Adams.

MR. J. H. MILLS has the contract for steam-heating apparatus and ventilation of the Buffalo State Insane Asylum. Also of Col. John C. Graves' new residence.

NEWARK, N. J.—The special committee, consisting of Mayor Haynes, the City Surveyor, and Engineers Fteley and Adams, of New York, and Rudolph Hering, of Philadelphia, made a visit to the sewer district, and to the manufactory of Bless & Drake, where Mr. Bless exhibited the model of his plan for the abatement of the nuisances, September 12. At the meeting of the committee the same evening bids were submitted from Messrs. Ross & Sanford at \$8,850, and from B. Sanford at \$8,678, to provide temporary relief, and from Morris & Cummings to rent their dredging machine for \$75 per day and expenses. The City Surveyor and others thought that for \$3,000 the creek could be dredged, the gate of the flusher replaced, and all relief possible obtained.

ROCHESTER, N. Y.—Contract for pipe-sewer in Grove Street awarded to Thomas Oliver & Son for \$302.60; estimate \$570. Contract for pipe-sewer in Sigel Street awarded to Whitmore, Rauber & Vicinus for \$351.25; estimate \$505. Chestnut Street improvement to Whitmore, Rauber & Vicinus for \$3,173.95, to be of blue stone. Alexander Street improvement awarded to Warren Scharf Asphalt Paving Company for \$26,702.

A WATER-MAIN twenty inches in diameter, 100 feet long, and containing fifteen tons of steel, was successfully laid across Buffalo River to the Island recently.

SOME gentlemen in Savannah, Geo., are to make an attempt to procure a water-supply by an artesian-well, and are asking for proposals from well-borers. The artesian-well at Charleston, S. C., is 1,970 feet deep, and flows at the rate of 360,000 gallons a day.

GOVERNMENT WORK.

PASSAIC, N. J.—The Chief of Engineers' report for this year recommends an appropriation of \$150,000, to be used in commencing improvements projected for Newark Bay and completing and maintaining the improvement projected in the Passaic River.

COCHeco RIVER, N. H.—Contract for deepening channel, about 4,200 cubic yards, awarded to Thomas A. Symonds, of Leominster, Mass., at an average of \$6.20 per yard.

ROCK ISLAND HARBOR.—The contract was awarded to A. J. Whiting, who bid \$2,300 for dredging, \$2,000 for dredge and plant. Other bids given last week.

COWHITZ RIVER, WASH. T.—Building dams, maintaining wing-dams, and removing snags. Only one bid received, from J. Kellogg, Portland, Oreg.: For removing and destroying 100 snags, more or less, \$5 each; building wing-dams, 300 lineal feet, 3 feet high, \$1.50 per lineal foot; monthly maintenance of channel and repairing wing-dams, \$50 per month. Mr. Kellogg's bid was accepted.

ROCKLAND HARBOR, ME.—Abstract of bids received by Colonel Blunt for supplying 35,000 tons of rubble-stone: Parke & Sylvester, Boston, Mass., \$1.14 per ton; William P. Hurley, Rockland, Me., \$1.05; Bodwell Granite Co., Rockwell, Me., \$1.28½; John F. Hamilton, Portland, Me., \$1.06; Thomas A. Rowe, Newton Center, Mass., 88c.; Sargent & Hamilton, Portland, Me., \$1.19; Charles H. Edwards, Boston, Mass., \$1.04; Davis Tillson, Rockland, Me., \$1.20. The contract was awarded to Thomas A. Rowe.

CAPE FEAR RIVER.—Bids for dredging and furnishing stone for improvements were given in detail last week. Dredging contract was awarded to Rittenhouse Moore, of Mobile, Ala., at 14½ cents per cubic yard. The contract for stone was given to Ross & Lara, of Wilmington, N. C., for \$9,000 for small stone, at \$1.48, to be delivered at their wharf, and to G. Z. French, of Rocky Point, N. C.

ST. MARY'S RIVER, MICH.—Synopsis of proposals for improving Hay Lake Channel, St. Mary's River, Michigan: John Hickler, Buffalo, N. Y., 58c.; Carkins, Stickney & Cram, East Saginaw, 61c.; Williams & Upham, L'Ause, 63c.; Green Bay Dredge and Pile-Driver Company, Green Bay, Wis., 69c.; Dodge & Petrie, Little Falls, N. Y., 70c.; Chicago Dredging & Dock Company, Chicago, 70c.; Fitzsimmons & Connell, Chicago, 72c. Contract awarded to John Hickler.

JACKSON, MICH.—The representatives of the different manufacturers of pumping machinery will have to wait until the first week in October before the awards will be made for supplying the new machinery for the water-works. The bids ranged from \$13,350 to \$33,350.

BAYHEAD LIFE-SAVING STATION, N. J.—Proposals opened September 4, for building a

life-saving station: Augustus M. Cox, Barnegat, N. J., \$7,300; James Thompson, Clifton Station Island, N. J., \$6,850; William Sevens, Camden, N. J., \$7,473; Hartman Graun, Philadelphia, \$7,486; Hiram W. Neary, Point Pleasant, N. J., \$5,922; Stephen W. Newbury, Manisquan, N. J., \$6,345; Francis H. Smith, New York City, \$5,590; George W. Sherman, Atlantic City, N. J., \$6,950; Rowland A. Robbins, New York City, \$6,169; Titus & Conrad, Trenton, N. J., \$6,650; Elwood K. Warren, Bayhead, N. J., \$5,976. The contract has been awarded to Francis H. Smith.

JACKSON, TENN.—Masonry and carpenter-work on Custom-House and Post-Office: Smith, Sargeant & Co., masonry, \$24,040 for St. Louis bricks and \$25,523 for Philadelphia bricks, carpenter-work \$4,317; Belknap & Dumesnil, masonry \$28,990, carpenter-work \$4,000; Joseph M. Marshall, \$27,977 for entire work.

COLUMBUS, O.—Bids for iron beams, columns, etc., of court-house and post-office: McHose & Lyon, \$12,000, no check with bid; Snead & Co. Iron-Works, \$9,200; Phoenix Iron Co., \$11,250; Thomas H. Brooks, \$11,818.68; Haugh, Ketcham & Co., \$9,700; L. M. Morris, \$8,998.90; Caldwell & Lane, \$10,449; Cleveland Bridge & Iron Co., \$14,369.75, no check with bid; H. A. Ramsay & Son, \$10,482.

JACKSON, MISS.—Bids for lathing and plastering of post-office and court-house, opened September 11: Smith & Crump, \$3,731; H. & T. Mellon, \$4,545; Joseph Eastman, \$2,821; Hull & Graves, \$6,495.

Association News.

CIVIL ENGINEERS' CLUB, CLEVELAND, O.—At the regular monthly meeting, September 10, an unusually large attendance was called out by the subject assigned for discussion—"The Purification of the Cuyahoga River." Mr. C. P. Ireland acted as chairman. A paper on the subject above mentioned was read by Mr. J. H. Sergeant, who advocated a system of intercepting sewers, sunk deep under the flats, having four receiving-wells. From the main receiving-well he proposed that a tunnel five feet in diameter should be driven in a direct line under the city; that pumping-engines should lift the sewage to the lake level, and thence it should be conducted by a large flume on a pier 300 feet into the lake. Others advocated the system used in purifying the river at Chicago, claiming that it would be impossible to keep the sewers in Mr. Sergeant's plan free from sand and other obstructions.

PHILADELPHIA MASTER PLUMBERS.—The regular monthly meeting of the association was held in its rooms, Seventh Street, above Arch Street, on Thursday evening, September 11. Mr. John J. Weaver, the president, in the chair. On account of the extreme heat of the evening barely a quorum was in attendance, and the business was urged through as quickly as possible. The committees reported nothing of importance. Inquiry was made as to whether water-rent would be charged for water used in the operating of water-closets placed in a plumber's shop merely for the purpose of show, and Mr. Weaver stated that some time since he had a talk with Chief Ludlow on this subject, and he had informed him that water-rent would be charged for such use, but recommended that councils be petitioned to pass an ordinance exempting such closets from water-rent, and had promised his influence to secure such exemption; a committee was appointed to draft an ordinance for action on by councils. The subject of the conference between the New York Master Plumbers and the manufacturers and dealers was introduced and various opinions thereon expressed.

THE Board of Directors of the Trade-School of Philadelphia intended opening the school about the middle of this month, and all preparations therefor had been perfected, but owing to the intense heat of the past week it was thought best to postpone the opening until about the first of October.

JOURNEYMEN PLUMBERS' AND GAS-FITTERS' BENEVOLENT AND PROVIDENT ASSOCIATION, BROOKLYN.—This association filed articles of incorporation on September 12. The incorporators are James L. Campbell, James J. Henson, Patrick Dunne, John Collins, and Michael J. Driscoll. The officers of the association are Benjamin C. Davis, President; George W. Heath, Vice-President; Charles Handover, Recording Secretary; William Heron, Financial Secretary; Harry Troy, Treasurer; P. D.

Brady, Sergeant-at-Arms; Stuart Barr, James J. Doody, and Andrew L. Wright, Trustees.

AMERICAN SOCIAL SCIENCE ASSOCIATION.—The meeting of 1884 opened at Saratoga on Tuesday evening, September 9, Hon. John Eaton presiding, and delivering the opening address. On the following day papers were read by Professor W. T. Harris, of Concord, Mass., on the "Study of Greek and Latin in American Colleges;" by Mrs. Sarah B. Cooper, of San Francisco, on "The Kindergarten as Church Work;" by Mrs. Emily Talbot, on "Recent Educational Work;" by Miss L. I. Lumsden, of Aberdeen, Scotland, on "The Higher Education of Women in Great Britain and Ireland;" and by Mr. F. B. Sanborn, General Secretary, on "The Commonwealth of Social Economy." The afternoon was spent in a joint session with the National Prison Association. On Wednesday the association met in the Departments of Health and Finance, and the principal papers in the former were by Professor D. A. Sargent, of Harvard, on "The Tendency of Modern Athletics;" by Professor Edward Hitchcock, of Amherst, on "Physical Training in Colleges," and by Mrs. Dr. Lucy N. Hall, of Brooklyn, who spoke on questions of sanitation in dwelling and tenement-houses, on the physical training of girls, social purity, and inebriety. Mrs. Hall spoke strongly of the great necessity for healthfully located, healthfully constructed, and properly supervised buildings, saying that all appliances for the carrying away of sewage should be in a separately constructed portion of the building, and calling attention to the pernicious effects of sunless rooms and the overheating of living-rooms in winter. In the Department of Finance the association was addressed by Henry C. Adams, on "The Financial Standing of States," and by Carroll D. Wright, of Boston, the well-known collector of labor statistics, on "The Scientific Basis of Tariff Legislation," and a paper by Mr. Atkinson, on "What Makes the Rate of Wages," was read by the secretary. The sessions of Thursday were held in the Department of Jurisprudence, and opened with a discussion on lunacy laws, followed by an essay on "The Conflict of State Laws," by Eugene Smith, of New York City, and on "The Threefold Basis of Criminal Law," by Rev. F. H. Wines, of Springfield, Ill. In the evening, Mr. George W. Cable, the novelist, spoke on the "Condition of the Freedmen before the Law." The meeting of the association closed on Friday, with a session in the Social Economy Department, which was addressed by the chairman, Mr. F. B. Sanborn, and after the reading of a paper by Mr. E. M. Shepard, of Brooklyn, on "The Extension of Reform Methods to the Civil Service of States and Cities," a general discussion on the subject took place. In remarks made by President White, of Cornell University, he said that some years ago he was a member of a Senate committee appointed to examine the Health Department in the city of New York. He gave an account of its investigation there, and the glaring cases of ignorance, incompetency, and inefficiency. The Health Wardens of the wards were found to be, in most cases, nothing more than corner-grocerymen, who were receiving the emoluments of political favoritism. The result of the examination was the creation and passage by the Legislature of a bill that swept away the whole system of those so-called "Health Inspectors," and substituted the present effective Board of Health. A paper by Miss Mary M. Cohen, of Philadelphia, on "Hebrew Charities," also excited some favorable comments. The association then adjourned, to meet again at Saratoga Springs, September, 1885.

NEW ORLEANS AUXILIARY SANITARY ASSOCIATION.—The Executive Committee met on September 11, Henry Ginder, Esq., in the chair. It was voted that Dr. W. H. Watkins, Sanitary Director, be appointed a delegate to the American Public Health Association's annual meeting, to be held at St. Louis, October 14 to 17. The report of the Sanitary Director for the month was then read. It gives the total number of deaths in New Orleans during August as 521, of which 220 were colored. Small-pox caused 67 deaths. Entire absence of epidemic infectious disease is noted. The question of water-supply was discussed by Dr. Watkins, who presented many analyses of contaminated cistern-water. In sanitary work officers had made 4,093 inspections, 2,710 re-inspections, had found 2,430 nuisances, and abated 1,896. After accepting Dr. Watkins' report the association passed a resolution approving the plan of removing fecal matter by pipes now under consideration by the City Council Health Committee.

AMERICAN ELECTRICAL EXHIBITION, AT BOSTON.

THE American Electrical Exhibition, to be held in the building of the Massachusetts Charitable Mechanic Association of Boston, will be opened to the public on November 24 next, and closed on January 3, 1885. It will aim to give a complete exposition of the rapid advancement in electrical science, its possibilities and probabilities. There will be nine sections, devoted respectively to the production of electricity, electric-conductors, measurement, application (low power), application (great power), terrestrial physics, historical apparatus, special novelties, and electrical literature. Space and power will be free to exhibitors, but an entrance fee of \$10 is required. Scientific men will be asked to examine the exhibits and report on their merits. Medals will be given for articles of special value to science, and a medal for the best general exhibit will also be awarded. Exhibits may be sold but not delivered during the exhibition, except by special permission. Mr. P. H. Alexander is the general manager; Mr. W. S. Hall, superintendent; and Mr. E. W. McGlenen, business manager. Information as to the rules, application for space, etc., should be addressed to the American Electrical Exhibition, P. O. Box 1,130, Boston, Mass.

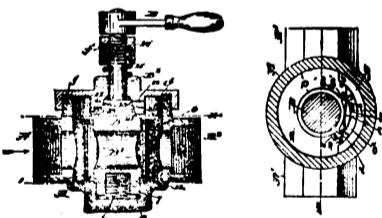
THE CENTURY FOR 1885.

ARMY officers and all interested in the military history of the last war will be pleased to learn that a notable series of papers on the great military and naval battles of the war for the Union will begin in the *Century* for November. The contributors will be general officers high in command on either the Union or Confederate side. Thus, the battles of Shiloh and Vicksburg will be described by General U. S. Grant, who will contribute four papers to the series; General Beauregard will write of the First Bull Run; General McClellan, of Antietam; General Rosecrans, of Stone River; etc., etc. The Passage of the Forts below New Orleans will be described by Admiral Porter, and the Western Gunboat Service by Rear-Admiral Walke, and the fight between the "Monitor" and the "Merrimac" by Col. John Taylor Wood, the senior surviving officer of the latter vessel.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

297,986. VALVE. J. MORTIMER GOLDSMITH, Boston, Mass. Filed July 24, 1883. (No model.) Issued May 6, 1884.



Claim.—1. In a straight-way valve, a case or shell having a cylindrical seat, *b*, a valve-segment placed therein loosely, a head or valve-mover also in said shell, having a stem and a transverse fluidway or port, a spring interposed between said valve-segment and valve-mover, and projections on the two to engage such segment and its mover, all combined and arranged substantially as described.

2. The valve-case having the cylindrical seat *b*, a main valve-segment provided with a port, and an auxiliary valve-segment seated on the said main valve-segment, combined with the head or valve-mover provided with the transverse way *B'*, and with means to move the said valve-segments in succession, as and for the purposes described.

3. The valve-case and valve-segment inserted therein loosely, and the head or valve-mover provided with a suitable way for the passage of the fluid, combined with a spring to keep the valve-segment against the valve-seat *b*, substantially as described.

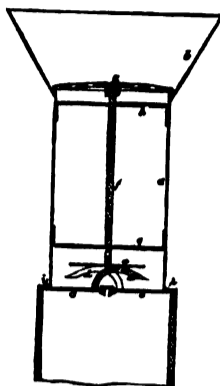
4. The valve-case provided with the cylindrical seat *b* and recess *ro*, and valve-segment inserted therein loosely, combined with the head or valve-mover provided with the way *B*, and with a pin or projection, *6*, and adapted to move the said valve-segment, substantially as described.

5. The valve-case and its cap provided with the hub *21*, extended into the said shell, and having passages *22*, combined with the head *B*, provided with the conical part *20*, having grooves, and with a spring to keep the said part *20* into the conical seat in the said extended hub, substantially as described.

6. The valve-case and its cap provided with the hub *21*, extended into the said shell, and having passages *22*, combined with the head *B*, provided with the conical part *20*, having grooves, and with a nut to regulate the force of the said spring, substantially as described.

7. The valve-segment provided at its rear side with projections or shoulders, combined with a flat-spring, *c*, having its ends abutted against the said shoulders, substantially as described.

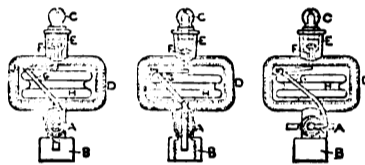
298,045. SEWER-TRAP. THOMAS WATKINS, Portsmouth, N. H. Filed July 17, 1883. (No model.) Issued May 6, 1884.



Claim.—1. In the herein described improved sewer-trap, the combination of each of its valves, arranged with and applied to the tubular body of the trap as specified, with a horn to extend upward from it (the said valve), and with a valve-closer resting upon such horn, and to operate with it, substantially as set forth.

2. The combination of the valve-closer (consisting of the strainer or perforated cover or plate *d*, the rod *f*, and the disk *e*), with guide-spiders *g* and *h*, the tube *a*, the valves *c*, and their horns *d*, adapted and arranged as set forth.

298,082. CUT-OFF GAS-BURNER. ALVAH C. AUSTIN, San Francisco, Cal. Filed June 14, 1883. (No model.) Issued May 6, 1884.



Claim.—The automatic gas cut-off herein described, consisting of the valve *F*, bell-crank *G*, expansion-drum *H*, and trip-pin *I*, arranged and operating in connection with the ordinary parts of a gas-burner, substantially as and for the purpose herein described.

297,998. SOLDERING-MACHINE. BERNARD HAUSBERG and JOHAN MEYENBERG, Cham, Switzerland, assignors to David S. Page, New York, N. Y. Filed March 15, 1884. (No model.) Patented in Germany February 19, 1881, No. 16,225. Issued May 6, 1884.

297,995. MOLD FOR DRAIN-TILES. CHARLES B. HEWITT, Racine, Wis., assignor to the Racine Cement and Pipe Company, of Wisconsin. Filed February 13, 1884. (No model.) Issued May 6, 1884.

298,002. TILE-MACHINE. WARNER LEWIS, Stone Bluffs, Ind. Filed August 11, 1883. (No model.) Issued May 6, 1884.

298,024. APPARATUS FOR GENERATING STEAM. WILLIAM A. PENTECOST, Worcester, Mass. Filed January 21, 1884. (No model.) Issued May 6, 1884.

298,026. METHOD OF MANUFACTURING ARTIFICIAL STONE. MICHAEL B. RANDLE and BENJAMIN E. TURNER, Statesborough, Geo. Filed December 31, 1883. (No specimens.) Issued May 6, 1884.

Claim.—The herein-described method of manufacturing artificial stone, consisting in subjecting a molded and partially hardened mass of cement, sand, and lime to a rubbing operation of cement, lime, and water for filling the cavities or pores in the stone, and giving it a smooth or polished surface, and finally saturating the stone with lime-water, substantially as herein set forth.

298,029. TAP-WRENCH. NELSON SAWYER, Hartford, Conn., assignor to Wallace A. Downes, Sing Sing, N. Y. Filed July 14, 1883. (No model.) Issued May 6, 1884.

298,048. WRENCH. NATHANIEL W. VANDEGRIFT, Bridgeport, Conn., assignor to Frank Armstrong, same place. Filed November 5, 1883. (No model.) Issued May 6, 1884.

298,057. GAS-GENERATOR. LYMAN C. BEEBE, Villisca, assignor of one-half to Robert Truman, Afton, Iowa. Filed October 11, 1883. (No model.) Issued May 6, 1884.

298,058. CARBURETOR. LYMAN C. BEEBE, Villisca, assignor of one-half to R. Truman, Afton, Iowa. Filed November 27, 1883. (No model.) Issued May 6, 1884.

298,059. CURVED PIPE. JOHN FRANCIS BENNETT, Pittsburg, Pa. Filed September 24, 1883. (No model.) Issued May 6, 1884.

298,088. REFRIGERATING CAR AND CHAMBER. EDWARD HAMILTON, Boston, Mass. Filed April 30, 1883. (No model.) Issued May 6, 1884.

298,098. FURNACE-GRATE. OMAR H. JEWELL and WILLIAM M. MATHISEN, Chicago, Ill. Filed November 27, 1883. (No model.) Issued May 6, 1884.

298,097. ROAD-SCRAPER. LEWIS LAMBORN, Hamorton, assignor to the Lamborn Road Machine Company, (Limited,) Media, Pa. Filed December 11, 1883. (No model.) Issued May 6, 1884.

298,101. PROCESS FOR THE PURIFICATION OF WATER. ALBERT R. LEEDS, Hoboken, N. J. Filed November 3, 1883. (No model.) Issued May 6, 1884.

298,119. UTILIZING THE EXHAUST OF ENGINES. DAVID RENSHAW, Braintree, Mass. Filed February 21, 1883. Renewed October 10, 1883. (No model.) Issued May 6, 1884.

298,140. WATER-COOLER. JOHN EDWARD WELLING, Georgetown, Ky., assignor to himself and Justice Webb, same place. Filed March 5, 1884. (No model.) Issued May 6, 1884.

298,150. HOSE-COUPING. ALBERT ZOLLER, New York, N. Y. Filed November 22, 1883. (No model.) Issued May 6, 1884.

298,163. FIRE-ESCAPE AND WATER-CONDUCTOR. VIRGIL W. BLANCHARD, New York, N. Y. Filed January 18, 1883. (No model.) Issued May 6, 1884.

298,208. PUMP. JOHN G. IRVING, Markdale, Ontario, Canada. Filed May 19, 1883. (No model.) Issued May 6, 1884.

298,224. FLANGING MACHINE. THOMAS R. MORGAN, Sr., Alliance, O. Filed October 29, 1883. (No model.) Issued May 6, 1884.

298,225. BENCH-VISE. WILLIAM H. NORTALL, Bridgeport, Conn., assignor to C. S. Leet, same place. Filed October 10, 1883. (No model.) Issued May 6, 1884.

298,280. ROTARY METER. JOHN A. PAER, Grass Valley, Cal., assignor of one-half to John J. Berger, Brooklyn, N. Y. Filed September 1, 1883. (No model.) Issued May 6, 1884.

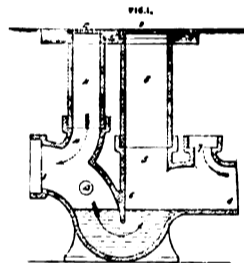
English Patents.

3,845. IMPROVEMENTS IN FREEZING OR REFRIGERATING APPARATUS. A communication from Edouard Fixary, a person resident at Paris, in the Republic of France.

JOHN HENRY JOHNSON, of 47 Lincoln's Inn Fields, in the county of Middlesex, gentleman. Prov. spec. July 13, 1883. Letters patented January 18, 1884. (Price 6d.)

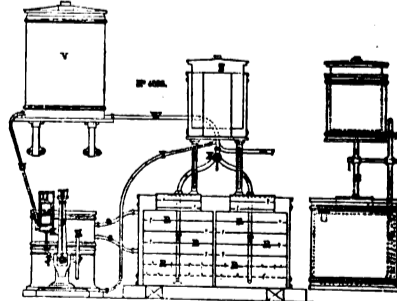
3,951. IMPROVEMENTS IN TRAPS FOR SANITARY AND OTHER PURPOSES. THOMAS SEAVILLE TRUSS of No. 2 Great Woodstock Street, London, W., in the county of Middlesex, civil engineer. Prov. spec. August 15, 1883.

4,438. IMPROVEMENTS IN VENTILATING SYMPHON-TRAPS FOR DRAIN, SOIL, OR WASTE-PIPES, and in what manner the same is to be performed.



JAMES MILLER, of 4 Seymour Street, Glasgow, in the county of Lanark, North Britain, builder. Com. spec. March 6, 1884. (Price 4d.)

4,858. IMPROVEMENTS IN APPARATUS FOR THE MANUFACTURE OR PRODUCTION OF GAS FOR LIGHTING AND HEATING PURPOSES. A communication from Sylla Auguste Giraudon, a person resident at Paris, in the Republic of France.



The invention relates to improvements in apparatus for producing or manufacturing gas for lighting and heating purposes by carbureting air by passing it through volatile oils or hydrocarbons.

GEORGE FREDERICK REDFERN, of the General Patent Office, No. 4 South Street, Finsbury, in the county of Middlesex, patent agent. Prov. spec. October 12, 1883. Letters patented April 10, 1884. (Price 6d.)

4,150. IMPROVEMENTS IN WINDOW VENTILATORS.

This invention has for its object the admission of fresh air into every description of buildings, also into carriages, steamers, or sailing-vessels and other constructions, with the absence of draught, and, when required, at an increased temperature.

GEORGE CONNELL, of the City and County of Newcastle-on-Tyne, building surveyor. Prov. spec. August 28, 1883. Letters patented February 28, 1884. (Price 6d.)

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THE NEW YORK BOARD OF HEALTH'S NEGLECT.

DURING the past summer the New York Board of Health has exhibited at the International Health Exhibition, in London, copies of the New York laws and the sanitary code, and the printed forms used in the enforcement of the tenement-house, plumbing laws, and other requirements of the sanitary code. The exceptionally strong powers conferred on this board and the record of much good work done in the past elicited the praise and admiration of the sanitarians, the legislators, and the press of England.

If these gentlemen, however, should see the condition of some of the houses occupied by swarms of Italians, Polish Jews, Irish, and tramps—as, for instance, 35 and 56 Mulberry Street, 72 Greenwich Street, 3, 5, and 7 Bayard Street, 62, 66, and 68 Division Street, and 51 Mulberry Street—they would be very apt to conclude that their admiration of the executive capacity and nerve of the New York Board of Health was largely uncalled for and quite undeserved by the present organization.

It is said that in Marseilles and Toulon, bad as were the dwellings of the poorest natives, those of the Italian colonies were far worse, and that in these latter first appeared the fatal disease. Precisely this is what may not improbably happen in New York. Personal investigation confirms the opinion long since expressed by THE SANITARY ENGINEER, that only the most radical measures can adequately deal with this question. The tenement rookeries must be dealt with as a menace to the safety of the community.

To be sure, the official incompetence and helplessness which has shown itself in Naples, and that superstitious ignorance of the lower classes which regards the physicians as poisoners and finds its greatest comfort in tearing open disused shrines and indulging in religious processions and dangerous street demonstrations, would not here present such difficulties to the authorities, but in other respects the conditions are not unlike, as indicated by our illustration on another page.

The recent accounts of the action of the New York Board's disinfecting corps in temporarily turning into the street a squad of wretched tramps while some copperas-water was squirted over the filth of their apartments in the houses in Mulberry Street, to which these wretched beings were allowed to return, makes it very clear that the board, either through the want of nerve or the want of energy, is failing to exercise the powers vested in it and which the community expect it to exert whenever the emergency arises. The New York Board of Health has the power to treat the wretched and filthy Italians that infest certain buildings as vagrants if need be. The plea that the board does not know who owns these vile buildings, and that there are legal obstacles in finding out the owners and securing repairs, is simply quibbling and evading responsibility.

The board has the power to order the buildings vacated at once. The tenants that have the means can seek some other quarters, and if they wreck these quarters they should be rooted out until they live in accordance with the customs of civilized beings on the Western Continent. Those who are unable to secure quarters should be taken care of as vagrants. If these buildings are emptied owners will soon be found that will either tear them down or make them habitable.

We have no desire to underrate the good already accomplished in New York, but in view of the experience of Naples and Toulon, and the penalties there incurred by the neglect of the simplest sanitary requirements, we are forced to remind our health authorities that the filthy parts of Naples are transferred to portions of this city, and that it would be well for the individual commissioners to do a little "slumming" on their own account.

The problem before the Board of Health is no different and no greater than that which was before a former board, who rooted out the cellar population some years ago. In other words, it is the duty of the board to act to-day with regard to the inhabitants of these pest-holes just as it would act if we had a pestilence of cholera and a mortality of 1,500 a day. Such action had better be taken now than when the disease breaks out and has to be grappled with. With law, public opinion, and a press ready to sustain it, more nerve and less desire to get on easily is what is wanted.

THE GAS QUESTION IN BOSTON.

UNDER the title of the Consumers' Gas Company, a corporation, of which the principal promoters are New York men, has applied to the Mayor and Aldermen of the city of Boston for permission to dig up the streets, lay mains, and acquire all municipal privileges necessary to carry on the business of a public gas company. The report of the Committee on Paving, to which the matter was referred, has just been published. After listening to a great deal of testimony and giving the matter careful investigation, the majority report adversely, assigning, as it seems to us, excellent reasons therefor. They find that the chief promoters are Messrs. M. S. Frost & Son, of New York City, builders and constructors of gas-works, Mr. H. M. Pierson, a gas engineer and inventor of a process for making water-gas, and other capitalists of New York and elsewhere; that when the petition was filed the petitioners had no corporate existence in Massachusetts; that while 3,000 gas-consumers signed a petition in behalf of the Gas-Consumers' Company, none of them appeared before the committee to show that they had any grievances against the corporations now supplying the gas of Boston; and that the process proposed to be employed has never been used for commercial purposes, but only tested in laboratories. The price proposed to be charged by the new company is \$1.35 per thousand feet, as against \$1.50 now paid. Under these circumstances the majority decline to recommend that the inconveniences and discomforts attending the introduction of a new system should be permitted, adding forcibly that "the petitioners utterly failed to show any public necessity for the granting of their petition. On the contrary, it appeared from the statements of their own witnesses that in Boston proper, where there is only one company, the price is 75 cents per thousand feet less than it is in Brooklyn, N. Y., where there are seven competing companies, and it was further admitted that the history of competition in gas has invariably resulted in combination and the charging of a higher rate."

The minority, on the other hand, present the usual arguments as to the financial standing and bona fide purpose of the petitioners, and express

implicit confidence in their ability to furnish gas twenty-five per cent. better in quality at fifteen cents less per thousand feet, and that they should be allowed a chance to serve the citizens of Boston, because the Boston Gas-Light Company has in former years found the business profitable.

It seems to us that the position taken by the majority of the committee is sound. Here in New York, with seven companies in existence, we are paying \$2.25, while in Boston, with one company, \$1.50 is the charge. As a business speculation the promoters of this enterprise, if they are successful, may find it profitable. The prospective profit and advantage to the citizens of Boston is not, however, apparent.

VACCINATING AN ACTRESS.

AN amusing incident, illustrating the difficulties attending the enforcement of sanitary regulations through the ignorance and prejudice of foreigners, occurred on the arrival of the "Scythia," of the Cunard line, at Boston, lately. The quarantine regulations of the Boston Board of Health require that "all persons under ten years of age who have not been successfully vaccinated, and all persons over ten years of age who have not recently been successfully vaccinated or re-vaccinated, be considered as unprotected from the effect of the contagion of small-pox, persons having had an attack of small-pox excepted." This carries out the following regulations of the National Board of Health, approved by the President November 14, 1881:

1. That all persons coming from or through any foreign port or place in which small-pox exists, who after the 14th day of November, 1881, shall arrive at any port of entry within the United States, shall be subjected to examination as regards to their protection from that disease, by the proper health authorities of the State within which such port lies; or in case such authorities shall fail or refuse to enforce this rule, then by some officer or other proper person, to be designated by the President of the United States.
2. That in case any person so arriving shall refuse to submit to such examination, or upon undergoing the same shall be found not sufficiently protected from small-pox, such person, and in case he or she be not *sui juris*, then also the person having him or her under charge, shall be detained in quarantine until he or she shall have been properly vaccinated or shall have passed the period of incubation from date of last exposure.

On the "Scythia" Dr. Cogswell found among the steerage passengers a young woman who could show no vaccination marks, but who insisted that she had once been vaccinated *on the forehead*. Her objection to the process having been with difficulty overcome, the "operation" was performed, but as the doctor turned to go she began to wipe the vaccine off with a moistened handkerchief. The operation was repeated, and only by the threat of being handed over to the police was she induced to submit. To newspaper reporters the girl represented herself as an English actress, fearful of undergoing Ellen Terry's unpleasant experience. As Miss Terry's histrionic sisters do not usually visit this country by way of the steerage of a Cunarder, we presume no pronounced sensation may be expected from this incident in theatrical circles; at any rate, it may be of interest for our English friends to know that the Boston and New York health authorities use only pure calf lymph in vaccinating.

FILTHY SCHOOL BUILDINGS IN CLEVELAND.

WE regret to see by newspaper accounts that the condition of the Cleveland public schools is rendered wretched in the extreme through overcrowding. We had supposed that the public spirit of that town would have rendered impossible such a state of affairs as has existed in New York, Philadelphia, and Hoboken. It appears from the report of a Cleveland correspondent of the Buffalo *Courier* that the relief buildings used to accommodate the overflow are in some cases perfect death-traps, some grades being stowed away in cellars, with damp brick pavements and walls, and other places being freely exposed to the wind but not to the sun. New

buildings are in course of erection, but meanwhile the children are exposed to serious danger. It is impossible to believe that the public-spirited citizens of Cleveland will long tolerate this sort of thing.

It would seem that Detroit urgently needs a more stringent building law or stricter enforcement of that now existing. On the morning of September 11 the new Detroit Roller-Skating Rink fell upon the workmen engaged in its erection, injuring eight men, two of whom were so severely hurt that they died soon after reaching the hospital. The criminal recklessness of putting up any building in such a fashion is increased in this case by the character of the structure, which was intended to be thronged by the public. The accident was caused by attempting to put an arched roof, with heavy trusses, over unsubstantial walls of pine board nailed to slight scantling. As the building was outside the city fire-limits, the proper remedy of the injured parties seems to lie in a suit for damages against the architect and builders responsible for the construction. Such action, it is to be heartily hoped, will be taken as to serve as an example to those inclined to trifle with human lives thus recklessly.

POLLUTION OF THE POTOMAC.

THE report of our Washington correspondent, printed in another column, shows that while there has been gross exaggeration in the sensational newspaper dispatches, there is nevertheless some truth in the statements that the Potomac (which supplies Washington with its drinking-water) has been, in some cases, defiled by throwing in the carcasses of animals. It is gratifying to us to be able to congratulate the Health Department of the District on the prompt and vigorous action taken by it in investigating the matter and in taking steps to prevent the recurrence of the contamination. Dr. Smith Townshend, the Health Officer of the District, not only proceeded at once to examine in person the localities which, it was alleged, had been polluted in this way, but issued and caused to be distributed to all sheriffs a circular calling upon them to warn the people of their several counties against continuing the practice, as well as a general circular addressed to the people of the Upper Potomac, pointing out the heinousness of the offense and the danger to the health of the inhabitants, and especially to those of the city of Washington, and calling upon all good citizens to lend their aid in its suppression. We have little doubt that these steps so quickly and energetically taken by the Health Officer will put an end to the practice, and that the Washington citizens may soon cease to regard their water with the suspicion so natural under the circumstances.

ALLEGED POISONING BY CANNED FOODS.

IN another column we quote an article on the subject of "Canned Foods," by J. P. Hawkins, C. S., Brvt. Maj.-Gen. U. S. A., from the *American Grocer*, which is of timely interest. In connection with this subject we may add that the last case of alleged poisoning through canned goods reported in the daily papers under sensational headlines has, like many before it, been proved to be not at all what was at first supposed. In this case (that of William Mack and family, of 273 Third Avenue), Dr. Cyrus Edson, of the Health Board, has discovered evidence showing beyond doubt that the illness was caused by a solution of sugar of lead, which had been used by mistake in place of white vinegar. The food (canned salmon) which had been previously eaten without the supposed vinegar produced no ill effects. The solution of the lead stood in a bottle close to the pepper, salt, etc., and it was admitted that it was used freely. In short, the tin can was made to bear the blame that properly belonged to the carelessness and ignorance of the person preparing the meal.

CREMATION FOR PAUPERS.

THERE seems to have been some mild discussion of late before the Commissioners of Charity and Correction, of Kings County (N. Y.), as to the practicability and economy of burning instead of burying the bodies of paupers in the future. As might be expected, the worthy officials take an economic rather than a sanitary view of the matter. It is said that the Potter's Field is overcrowded, that interments average 100 per month, and that the purchase of new land would be costly. Moreover, it is estimated that over \$3,000 a year is now spent for coffins, whereas, under the plan proposed, apparatus could be built at an original cost of from \$5,000 to \$10,000, and that quite possibly the cost of cremation might be as low as \$1.50 per body. Thus, it will be seen that motives of economy may possibly have some effect on thrifty official minds, where sanitary and sentimental reasons appeal in vain. Cremation, however, is not so near becoming as an accomplished fact as one might imagine from this display of figures.

RASCALLY PLUMBING AGAIN.

THROUGH the vigilance of Inspector Walter G. Elliott, of the New York Board of Health, another piece of rascally plumbing has been discovered. It seems that the contracting plumber, Thomas C. Holland, of West One Hundred and Thirty-first Street, ran dummy branch vent-pipes of 1 1/2-inch lead into the partitions adjoining basins on the top floors of five houses, south side of One Hundred and Thirty-second Street, 200 feet east of Eighth Avenue (five dwellings owned by Samuel C. Hinman, of West One Hundred and Thirty-first Street). The law prohibits any lead pipes being extended above the roof, which led to the discovery of the fraud. These lead extensions were nailed and wiped to the tin roof, and had no connection with any pipe below. This was proved by detaching them. In the partitions the ends of the branch vents were carelessly battered together, permitting in some cases the escape of drain-pipe air into the adjoining sleeping-rooms. Holland was a regularly-registered plumber. He is said to have been paid in full for all work done at the time, and even in advance of his work. Holland made the plea that his workmen did this piece of work without his knowledge, and with the intent to get him in trouble. The justice, however, held him in \$500 bail to answer at Special Sessions. This trick might easily deceive an inspector, and its discovery is creditable to Mr. Elliott.

THE PERTH AMBOY YELLOW FEVER CASES.

INVESTIGATION shows the main facts in the cases aboard the "Africa," lying at Perth Amboy, to be these: The vessel left Baracoa—where she arrived from Santiago de Cuba on July 19—on August 14, and arrived at New York on the 19th. All on board were well, and a clean bill of health was received at quarantine. Some days later the ship proceeded to Perth Amboy, and there shipped a new crew, one of whom was John Benson. This man told his fellow-sailors that he came from Galvin's boarding-house, at No. 111 Cherry Street, New York, and that he had arrived from the West Indies about a fortnight before. On the 16th, Benson and a stoker named Hives, who had been with the ship during the whole voyage, were taken sick. Dr. Kelly, the Perth Amboy Health Officer, advised removal to a hospital, and the men were taken by rowboat to Tottenville, thence to Clifton by cars, thence to New York and Brooklyn by ferry, and to the Long Island College Hospital by carriage. Both died the next day. The steward of the vessel was also ill, but speedily recovered. On Monday of this week Health Commissioner Raymond, of Brooklyn, visited the "Africa." It had been taken out into the stream and disinfected. The carpenter was ill with symptoms which might be those of yellow fever. His case will be watched.

It is evident from the facts as given above, that the New York quarantine officers were in no way to blame in the matter, as the yellow fever seems to have been introduced into the vessel after it had passed quarantine. That the patients should have been conveyed to the hospital in some other way seems clear enough, and the responsibility of their being turned loose among hundreds of travelers will doubtless be determined hereafter. The action of the Brooklyn health and hospital authorities has been all that could have been desired, and at this date there is no occasion for alarm.

OUR BRITISH CORRESPONDENCE.

The Electric-Light in the Royal Courts of Justice—Sanitary Institute—International Red Cross Conference—Salmon Disease in the Tweed—Curious Accident from Bursting of Drain-Pipe—Death of the Founder of Teetotalism—Detection of Arsenic and Examination of Drinking-Water—Report on Metropolitan Water-Supply.

LONDON, September 13, 1884.

ARRANGEMENTS are now, during the long vacation, being made at the Royal Courts of Justice here, for the permanent installation of the electric-light. There will be two 100-horse power Galloway patent boilers and two single-cylinder horizontal engines, of 105-horse power each, either of which will be capable of the needed power. The current for the general illumination will be produced by six Crompton-Burgin compound-wound 10-unit machines, and there will be 650 20-candle power Swan-lamps. In the Central Hall there will be three 4,000-candle power Crompton-Crabb arc-lamps, worked by two Burgin series machines. A small Willans high-speed engine will work a 6-unit machine for lighting forty-five lamps in the daytime, the darkness of most of the corridors and passages rendering it necessary to have lamps in the daytime even on the brightest days.

The Autumn Congress of the Sanitary Institute of Great Britain will be held this year at Dublin, from September 30 to October 4. Sir Robert Rawlinson, C. B., will preside, and deliver the inaugural address. The sections will be as follows: "Sanitary Science and Preventive Medicine," President, the Registrar-General for Ireland; "Engineering and Architecture," President, the Engineering Inspector of the Local Government Board for Ireland; "Chemistry, Meteorology, and Geology," President, the City Analyst, Dublin.

The International Red Cross Conference was officially opened at Geneva on Monday last. M. Moynier delivered the inaugural address. The German Empress has offered a prize of 5,000 francs to be disposed of in any competition decided upon by the conference, for the purpose of promoting the welfare of the sick and wounded.

At the annual meeting of the Tweed Commissioners on Monday last a committee was appointed to make a comprehensive and exhaustive inquiry into the origin, development, and treatment of salmon disease. It appears from the report of the commission that 37,969 dead and diseased salmon and trout were taken from the Tweed during the last five years.

A drain-pipe just constructed in the Rue des Prêcheurs, Paris, has been the cause of a good deal of injury to persons and property. It appears that last Saturday evening the pipe burst, letting loose a large quantity of water which inundated the entire locality. As the workmen were repairing it a gas-pipe burst, and the gas, becoming ignited, at one time threatened all the neighboring houses with destruction. An old man died through fright, and another man was so severely burned that he died soon after in the hospital. Several firemen and other persons were seriously injured. Ultimately the fire was got under control, but not before a considerable amount of surrounding property had been destroyed.

The Trinity House officials have decided to continue for some time longer the inquiry at the Foreland light-houses into the relative value of gas-paraffin and electricity as illuminating agents for light-houses.

The founder of teetotalism, Mr. Joseph Livesey, died on the 2d inst., at Preston. He was ninety years of age, and had been a total abstainer all his life. In 1832 he drafted for the signature of himself and six others the first teetotal pledge, and during his long life wrote thousands of tracts, pamphlets, and leaflets in furtherance of the cause of temperance. His living to be ninety proves that total abstinence from alcoholic drinks is not incompatible with long life.

The Postmaster-General has conceded to the telephone companies the privilege of connecting the various telephone systems with the postal telegraph offices, and has also abandoned his claims for a royalty of ten per cent. to the Government on all private wires.

The applications for letters patent during 1883 were 5,993, being 248 less than in 1882.

Mr. Cassal, the public analyst for High Wycombe, gave during the past week, in the Hygiene Laboratory at the Health Exhibition, two demonstrations; the first on the detection of arsenic in the manufacture of articles for household use, the second on the examination of drinking-water. Arsenic, he pointed out, could be detected in paper by warming it with hydrochloric-acid or with sulphuric-acid and common salt, when chloride of arsenic, if there is any quantity of arsenic present, will be set free, and can be recognized by the dark color produced. He also approved of Marsh's test for arsenic. With regard to the examination of drinking-water, he said hardness in water could be best ascertained by a soap solution. Sulphate of ammonia will show if lead or iron be present in the water by the dark tinge produced, and permanganate of potass. will discover any organic impurity. The demonstrations were rendered more interesting by the good practical illustrations which accompanied them.

The annual report for 1883 on the metropolitan water-supply, by Mr. Crookes, Dr. Odling, and Dr. Tidy, has just been issued. More than 2,000 samples of water were collected under these gentlemen's supervision in London during the year, and they are of opinion that the river-water supplied to London is perfectly wholesome. They found very little organic impurity, and in several instances they differed from Dr. Frankland as to the character of the water supplied by the seven river companies.

SAFETY-VALVE.

THE IMPROVED SEWERAGE-WORKS OF BOSTON.

(Specially reported for THE SANITARY ENGINEER.)

THESE works have now been in use for about six months, disposing of the sewage of nearly the whole of the old city, as well as that of the Roxbury district. They were visited on August 27 by the Boston Society of Civil Engineers, which spent some four hours in their inspection, dividing its time between the pumping-station and the reservoirs at Moon Island.

As these works have been heretofore fully described and illustrated in your columns, it is needless to describe them again. I send, however, the following report on the problem now in process of solution, and over which there has been so much controversy and speculation:

The smooth and noiseless action of the Leavitt engine was a subject of general remark. One could hardly realize, while standing under it, that it was actually meeting with any resistance whatever. Its firm and steady motion in almost perfect silence seemed more like playing-work than actual exertion. The Worthington engine was equally noiseless, but this was taken rather as a matter of course, for the Worthington pump is always quiet in its action, while pumping-engines with heavy fly-wheels are more apt to work with a very perceptible shock accompanying the valve action, which was not noticeable in this Leavitt pump. Both engines were working at a reduced rate of speed, there being insufficient flow of sewage to work them at their full capacity. The Worthington pump is not intended for daily use, being a storm-water pump, and was probably put at work on this occasion to show its action to the visitors.

The tank-sewers, with their inlet and outlet-chambers, were next visited. The former showed very plainly the pulsations caused by the pumps, as the water boiled up some inches above the surface at every stroke. The tank-sewers have not yet been cleaned out, the apparatus intended for the purpose not being yet complete. As the outlet from these tank-sewers is below the surface, there is an accumulation of grease in the form of a scum over their whole extent, some inches in thickness, and of sufficient consistency to bear up a brick, even at the high temperature now prevailing. Experiments are being made to test the commercial value of this grease, which can be removed if found worth while. Otherwise it need not be collected in the tanks; for, if the outlet were taken from the surface, it would all flow off in a fluid form with the sewage into the sea, without causing any inconvenience.

On the arrival of the party at the reservoirs at Moon Island, two of the compartments were

found to be partly filled, and the tide having just begun to ebb, the small turbine was started, worked by the escaping sewage, and the gates thereby opened, by which the whole volume of the contents of the reservoirs was allowed to flow into the sea. Some time was spent in watching this outflow. The day was nearly calm, there being but a light breeze to ruffle the surface of the bay, while the contrast in color between the clear blue water and the inky sewage was very striking. The torrent rapidly spread out laterally to a width of a fourth of a mile or more in the first half mile of its progress, its specific gravity being much less than that of the sea-water on which it floated. Far beyond where the different colors could be detected from the shore, the advancing boundary of the stream of sewage was made clearly visible by the change in the ripple. The blue water was uniformly rippled, but the sewage had enough oily matter on its surface to quiet this for a time, while the whirls and eddies of the current had a like result in controlling the surface. It is found that the sewage never passes to the northerly side of Long Island, so that it does not enter the ship-channel until it has become so far diluted as to be no longer perceptible.

It must be remembered that Boston Harbor possesses peculiarly favorable conditions for this method of sewage disposal. It has an area of nearly, if not quite, forty square miles, with a tidal range of about ten feet. This prodigious mass of water is forced to find an exit during the ebb tide, through a strait less than four miles in width, bounded by Deer Island on the north and Point Allerton on the south. Into the middle of this great current the sewage is delivered during the first two hours of each ebb tide, which continues for four more hours to sweep it out and onward. Beyond the strait above referred to, which is some three and a half miles from Moon Island, the sewage is essentially in the open sea, subject to a dilution practically incalculable. This dilution is hastened by the large difference in specific gravity between the sewage and the sea-water, and by the ever-active currents and winds of Massachusetts Bay. There does not seem to be the remotest chance of any return-flow of sewage on the flood tide, to trouble the city or its surroundings in the way that the lower Thames is affected by the London sewage. Neither is there much chance of deposit from such a rushing body of water, spread out over a denser fluid in a part of the harbor where the scour of the ebb tide has always hitherto kept the channels clear.

The odor of this sewage as it passes through the pumps and finally escapes is more pungent than has been found in some other cities. This may be due in part to the fact that a good many of the old lateral sewers of Boston are by no means self-cleansing, being of an antiquated type and largely sewers of deposit. The effluvia at the reservoirs and outlet reminded one very forcibly of the sulphur springs which are now popular health resorts in different parts of the world, sulphuretted hydrogen being a prominent ingredient. This odor is much more pronounced in and about the tank-sewers and beyond them than at the pumping-station, which leads to the conclusion that it arises mostly from the putrefying scum of grease retained for some months on the surface within these tank-sewers. If the accumulation of this grease should not be found a source of profit, it will be abandoned. It is, at any rate, an unnecessary part of the scheme, and could be dispensed with if found to be objectionable.

EDWARD S. PHILBRICK.

THE city of Syracuse, N. Y., is considering the purchase of the water-works owned by the Syracuse Water Company, and a commission is to be appointed by the Supreme Court to appraise the value of the works. The Syracuse Water Company was organized in 1849, and furnishes water from springs, from Onondaga Creek, and from Furnace Brook. The supply from the first and last-named sources is by gravity, and that from the creek is pumped by steam into reservoirs. There are about fifty miles of distribution-pipe in the city.

SKETCHES OF PLUMBING DETAILS IN A RESIDENCE AT MADISON AVENUE AND SIXTY-NINTH STREET.

OUR illustrations are views in two rooms in the new house on the northwest corner of Madison Avenue and Sixty-Ninth Street, in this city.

Figure 1 represents a "needle-bath," in the principal bath-room. It is composed of seamless-brass pipes, plated throughout, and screwed and sweated in the principal joints. The floor of the room is white marble, laid on an especially prepared bottom, in which layers of asphaltum and cement are used. Underneath the whole is a leaden safe, which is accessible from the butler's pantry immediately below the bath-room. In the corner in which the bath stands the floor is one large slab, which is hollowed at the centre and inclined to a waste-grating, under which is a 4-inch trap accessible from the butler's pantry. Overhead is a lead-lined cistern to supply the showers and needle-bath only. To this cistern the warm and cold water pipes *h* and *c* are carried, the pipe *d* being for the purpose of trying the temperature of the water in the cistern, which of course may be made any temperature between that of the hot or cold water supplies. It is also used to draw the remaining water off. The large pipe at the back is the general supply from the cistern to the different rings of the "needle-bath," and to the shower and rose-spray. Each of the rings are controlled by a stop and regulating cock, which connects it with the perpendicular pipe at the back. These cocks are three-way, and are made to form part of the continuous rings, each segment of a circle being connected to the cock by a ground union, making it possible to remove the apparatus without tongs. At the lower end of the stand-pipe is an enlarged base to form a support for the pipe. From the centre of this is taken the pipe which supplies the rose-spray. Immediately under the main supply-cock the branch for the shower is taken. The cock in this pipe and in the pipe to the rose-spray are self-closing, the operation of opening them being by a chain-pull which hangs within easy reach at the back of the circle. The cock in the main supply is also self-closing, but withal is provided with a cross-lever and double-pull to make it possible to close it at all times. The pipe shown (*e*) with an elbow at its lower end is the overflow from the small cistern. The uppermost ring, which is about six inches larger in diameter than the others, supports rubber curtains on rings. The curtain on the left is shown removed, to give a better view of the perforated circles. The room has a polished-marble base about fourteen inches high, above which comes a white porcelain-tile wainscoting to the height of two feet six inches more, and above which is four feet of ornamental tiling. The remainder of the walls are oil-painted. All the fixtures of this room—which are needle-bath as shown, sitz-bath, and wash-bowl—partake almost of a portable nature, everything being raised from the floor so as to give an uninterrupted sweep to the eye. The pipes are carried in a simple manner straight through the floor, so as to be accessible from the room underneath, as before mentioned.

Figure 2 is a view in the bath-room connected with the nursery. It shows a partly portable infant's bath. The bath proper is made of polished copper, and is attached to a sliding frame, which, when run in, carries the bath under the wash-bowl and allows the doors to close over it. To the side of the bath is attached a standing overflow and valve-waste which cannot be drawn outside the limits of a leaden receiver in the floor of the basin-safe. This receiver of course is treated and piped the same as any fixture, the back-air pipe from its trap being the third pipe counting from the left, which bends over behind the bowl and forms a junction with the air-pipe from the basin-trap before entering the wall. The finish of this room is polished rock-maple.

The architect is Mr. William Schickel, of 346 Broadway, and the plumber is Mr. Thomas J. Byrne, of 253 Fourth Avenue, New York.

WARMING AND VENTILATING SCHOOLS IN PARIS.

A REPRESENTATIVE of the *Builder* recently visited what he terms two typical schools in Paris, with a view of examining their warming and ventilating apparatus. They were the school in the Avenue Rapp, frequented, for the most part, by the children of the working-people at the Government tobacco factory, and what he terms a middle-class school, known as the Lycée Condorcet, in the Rue d'Amsterdam.

In both cases the disposition of the rooms was very similar and the unilateral light secured. To the left of the

pupils the wall had large bay-windows overlooking a wide court or the street. On the right-hand side was the entrance-door and smaller windows carefully closed with wooden shutters, so that no conflicting rays of light should enter during class time. The warming and ventilation had been done in keeping with the principles accepted by the Society of Public Medicine. In the Avenue Rapp each class-room had a stove placed in the corner nearest to the outer wall and the master's desk. The chimney, instead of being taken up to the ceiling, ran horizontally along the outer wall, immediately below the window-sill, and was being enveloped by a metallic casing. An elongated warm-air box was thus created, fed with fresh air brought in directly from the outside by intakes made through the wall. The casing is perforated throughout, and the air,

ventilation are concerned, are disposed in the same manner; but they are warmed by steam under slight pressure. The steam is generated within a multitubular boiler of the Naeyer de Willebroeck type. From the basement, where the boiler stands, the steam goes straight up to the attic, where it passes through a reducing-valve and thence distributed to the coils. In the place of the chimney from the stove there are two steam-coils passing along the wall of the class-room. The upper and larger coil gives off a considerable quantity of heat. It is placed as near as possible to the bottom of the window to counteract the chilling influence of the large surface of glass. The fresh air from the outside is admitted at a height of only a few inches from the floor, and here it is only slightly warmed by passing over the second, and much smaller, steam-coil.

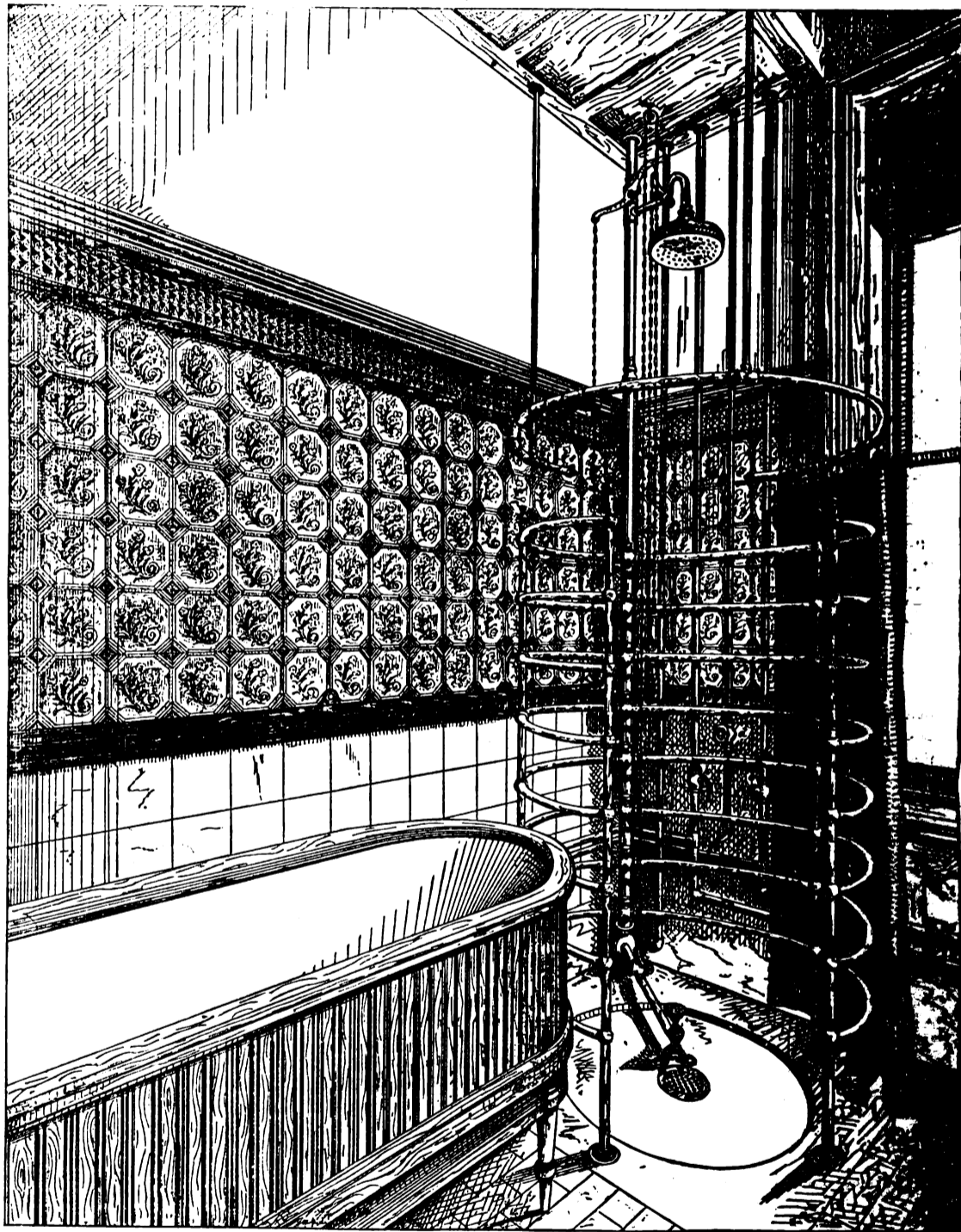


FIGURE 1.—NEEDLE-BATH.

warmed by passing over the stove-flue, enters the room. It does not suffice to warm a room, but it tends to the even diffusion of the warmth. The chimney or flue, after traveling horizontally along the outer wall of the room, is conducted upward to the roof, where it passes into the centre of an air-shaft, and the remaining heat of the flue further utilized to extract the foul air from the school. For this purpose the shaft has an opening near the ceiling of the room, and gas-burners placed within are sometimes employed to increase the suction.

The deduction drawn is that it is economical and suited to small rural establishments. The cost of the plant is estimated at 20 francs per pupil in class-rooms of fifty or thereabout.

The warming, etc., of the Lycée Condorcet is a more elaborate system. The class-rooms, so far as light and

The side-walls are also warmed with a steam-coil, the intention being to secure only an upward current of the air in the room; the fresh air entering being almost on a level with the floor is warmed and vitiated as it rises and comes in contact with the pupils, thence to travel upward until it reaches the ceiling, where it is to be drawn off by shafts communicating with lanterns in the roof containing coils or gas-burners. A notable feature of the system is the regulation of the heat from the outside, without in any way disturbing the pupils during their studies. An attendant goes the round periodically of the classes. A small opening in the wall, protected by glass, enables him to see a thermometer placed within the class-room, and, according to the degree of heat recorded, he turns the steam on or off.

The cost of the heating-plant for this school of 600 pupils was £4,080, and the working expenses for a season, including fuel and attendance, £340.

THE WORLD'S INDUSTRIAL EXHIBITION AT NEW ORLEANS.

ONE of the most valuable and suggestive departments of the forthcoming World's Industrial and Cotton Exposition at New Orleans will be that devoted to educational exhibits. Commissioner John Eaton, of the Bureau of Education, who has lately returned from Europe, has succeeded in obtaining from various countries, and especially from France, specimens of text-books, apparatus, appliances, plans and models of buildings, and other exhibits of great interest. The exhibits are to be classified under eleven groups: Education of children, primary instruction, instruction of adults; organization and appliances for secondary instruction; organization, methods, and appliances for superior instruction; printing and books; stationery, book-binding, painting, and drawing material; general application of the arts of drawing and modeling; photographic proofs and apparatus; musical instruments; medicine, hygiene, and public relief; mathematical and philosophical instruments; maps and geographical and cosmographical apparatus. This, it will be observed, gives commendable prominence to the sanitary and hygienic aspects of education, as one of the most important branches of the subject.

OUR readers interested in the manufacture of appliances used in connection with water and gas supplies, house-drainage, sewerage, plumbing, food-products, etc., should consider the advisability of exhibiting at the World's Fair, to be held at New Orleans this winter. From all accounts this exposition is likely to be a great success, and will attract multitudes of people who live in those sections where cities are growing rapidly and where the demand for such articles is a steady and increasing one. Many people of wealth and leisure who have been in the habit of visiting the South during the winter will undoubtedly include New Orleans in their trip, and it is quite possible that would-be purchasers will at New Orleans see articles that would entirely escape their attention at their own doors. It is to be hoped that the hotel accommodations will be ample and that every precaution will be taken which will insure immunity to those who stay in that city from the typhoid diseases which gross neglect at former exhibitions has made possible.

INTERNATIONAL INVENTIONS EXHIBITION.

THE International Exhibition of Inventions and Music, to be held during the year 1885 in the Exhibition Buildings, Royal Horticultural Gardens, South Kensington, London, will be the third of the popular and successful series, of which the Fisheries Exhibition of last year and the Health Exhibition of the present year have been the first and second. The list of officers is headed by Queen Victoria as Patron, and the Prince of Wales as President. Of the Executive Council, Sir Frederick Joseph Bramwell, F. R. S., V.-P. Inst. C. E., is chairman, and the Marquis of Hamilton, vice-chairman. The secretary is Edward Cunliffe-Owen, Esq., B. A., the present secretary of the Health Exhibition, and the council is composed of Sir Frederick Abel, C. B., D. C. L., F. R. S.; Isaac Lowthian Bell, Esq., F. R. S.; Edward Birkbeck, Esq., M. P., Honorary Treasurer; Colonel Sir Francis Bolton; Sir Philip Cunliffe-Owen, K. C. M. G., C. B., C. I. E.; Professor Dewar, F. R. S.; Joseph Dickenson, Esq.; Sir George Grove, D. C. L.; E. W. Hamilton, Esq.; Henry E. Jones, Esq., M. Inst. C. E., M. Inst. M. E.; W. H. Preece, Esq., F. R. S.; Sir Edward James Reed, M. P., K. C. B., F. R. S.; Professor Chandler Roberts, F. R. S.; John Robinson, Esq.; Warrington W. Smyth, Esq., M. A., F. R. S.; John Stainer, Esq., M. A., Mus. Doc.; R. E. Webster, Esq., Q. C.

The classification is under the two general divisions of Inventions and Music. The first will be devoted to apparatus, appliances, processes, and products invented or brought into use since 1862. Having in view the wide range of this International Exhibition, and the limited nature of the total available area, it will be necessary to restrict as much as possible the amount of space which can be allotted even to the most important classes; and only under exceptional circumstances can applications be entertained for space for objects which have been shown in the Smoke-Abatement Exhibition, 1881, the Fisheries Exhibition, 1883, or the Exhibition of Health and Education of the present year. As the exhibition will be limited to the illustration of industrial processes, examples of either the raw material employed, or the finished

product, will only be admitted when they are required for the full demonstration of a particular process. It is not proposed to allot space for the exhibition of manufactured goods alone, unaccompanied by any illustrations of the process of manufacture. Applications from foreign countries and the colonies will be received up to November 1.

Under the main division, the following group classification is made:

DIVISION I. (Apparatus, appliances, processes, and products brought into use since 1862): Agriculture, horticulture, and arboriculture; mining and metallurgy; engineering, construction, and architecture; prime-movers and means of distributing their power; railway plant; common road carriages, etc.; naval architecture; aeronautics; manufacture of textile fabrics; machine-tools and machinery; hydraulic-machines, presses, machines for raising heavy weights, weighing, etc.; elements of machines; electricity; apparatus, processes, and appliances connected with applied chemistry and physics; gas and other illuminants; fuel,

respective sections are in accordance with the classification and with the regulations.

The applicants for space from countries in which no commissioner has been nominated must appoint agents in England to act on their behalf.

Applications from foreign countries and colonies will be received up to November 1.

Packages from foreign countries must have painted on them the letters I. I. E. They must all be marked in such a way as to show distinctly from whence they come, the name of the country, and the name and address of the exhibitor.

A still more extended classification is made in the official prospectus, from which we extract the subjects most likely to be of interest to the readers of THE SANITARY ENGINEER. Only under exceptional circumstances will applications be entertained for space for objects which have been previously shown in the previous exhibitions (Smoke-Abatement, Health and Education, or Fisheries).

Under Engineering, Construction, and Architecture (Group III.), exhibits and models are desired relating to

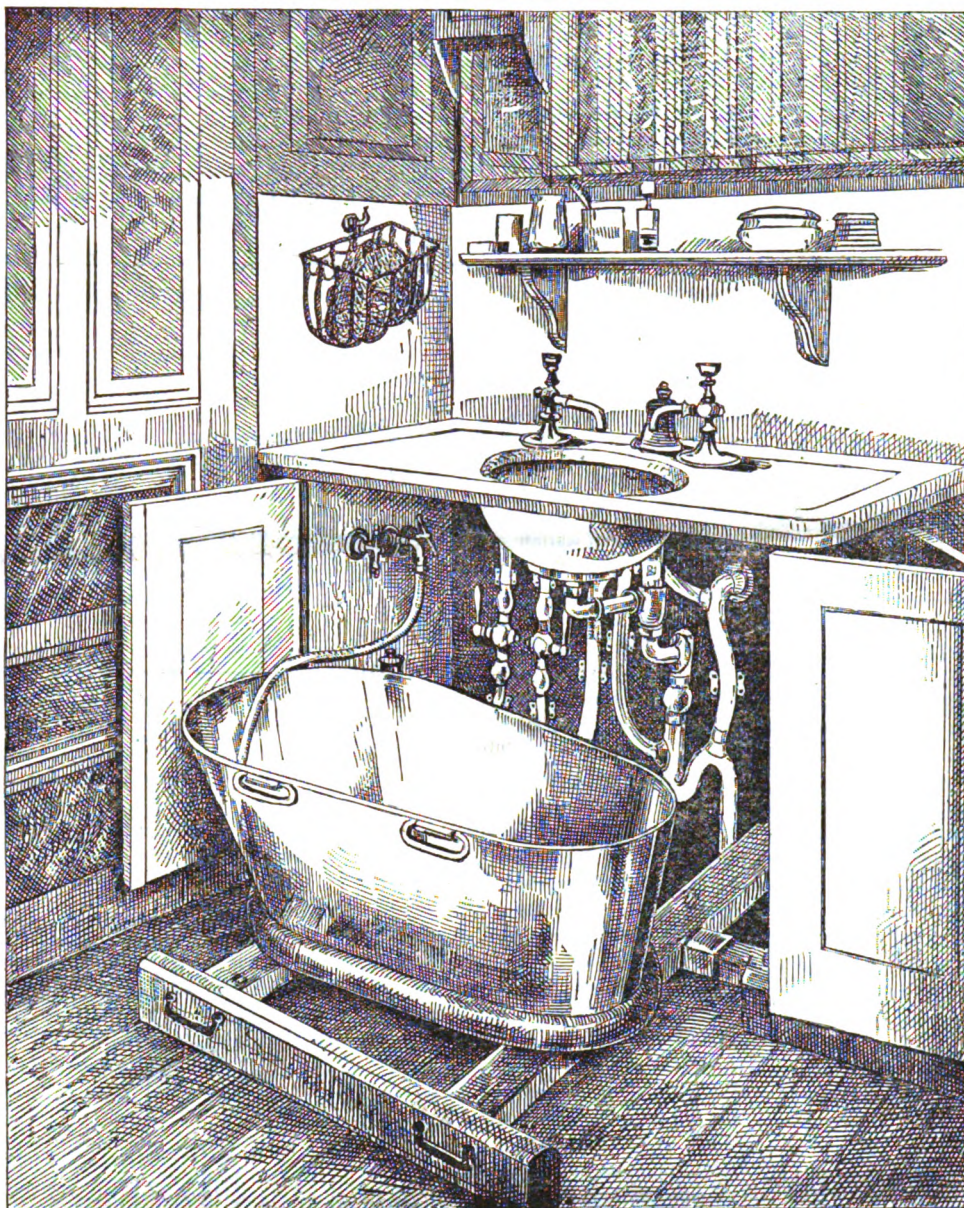


FIGURE 2.—INFANT'S BATH.

furnaces, etc.; food, cookery, and stimulants; clothing; jewelry; leather, etc.; India-rubber and gutta-percha, etc.; furniture and accessories—fancy goods; pottery and glass; cutlery, ironmongery, etc.; fire-arms, military weapons and equipment, explosives; paper, printing, bookbinding, stationery, etc.; clocks, watches, and other timekeepers; philosophical instruments and apparatus; photography; educational apparatus; toys, sports, etc.

DIVISION II. (Music): Instruments and appliances constructed or in use since 1800; music-engraving and printing; historic collections.

The special rules affecting foreign exhibitors are as follows:

The foreign and colonial commissioners appointed by their Governments are invited to communicate with the secretary. They will be charged with the consideration of all questions relative to the distribution of the space allotted to their respective countries; and the Executive Council will place at their disposal all information and plans that may be useful to them. Foreign and colonial commissioners will be required to guarantee that all exhibits in their

roads; railways and tramways; bridges and viaducts; docks and harbors; light-houses; rivers and canals; water-supply and sewerage: reclamation, irrigation, and drainage of land; testing apparatus; military engineering and fortification: materials used in building; building construction; heating, ventilation, house-drainage, etc.

In Group IV. (prime-movers and means of distributing their power) are to be included, steam-engines and boilers; gas and air engines; means of utilizing natural forces, and means of transmitting power.

Group XI. (hydraulic machines, presses, machines for raising heavy weights, weighing, etc.) will show exhibits of pumps (hand, steam, and rotary); fire-engines; cranes and other lifting-apparatus; hydraulic and other presses, and weighing machines.

Electricity (Group XIII.) will include generators; conductors; testing and measuring apparatus; telegraphic and telephonic apparatus; electric-lighting apparatus; electro-metallurgy and electro-chemistry; distribution and utilization of power; electric signaling; lightning conductors;

exported thence to the United States, by having designated by the Consul-General inspectors who should certify to the treatment of rags, said inspectors to be personally present at the disinfection, and to be paid by an assessment on each bale, and to brand each bale with the words, "Thoroughly disinfected." A desire to receive suggestions on the subject was expressed, and in particular as to the sufficiency of disinfection by boiling for at least four hours under a pressure of fifty pounds per square inch, and by thorough fumigation with sulphurous-acid gas. In reply Dr. Durgin wrote, on January 16, expressing the sympathy of the Boston Board of Health with the action contemplated, and adding: "The rags being subjected to the boiling proposed, or to the action of confined sulphurous-acid gas for six hours, burning $1\frac{1}{2}$ to 2 pounds of roll-brimstone in each 1,000 cubic feet of space, with the rags well scattered upon racks, will be satisfactory to us." In his reply Mr. Frelinghuysen announces the authorization of Mr. G. P. Pomeroy, agent and Consul-General of this country, to appoint a competent inspector, and in a letter of April 16 the following description of methods of inspection allowable, and the routine to be followed, are given:

1. Boiling in water for two hours under a pressure of fifty pounds per square inch.
2. Boiling in water for four hours without pressure; and
3. Subjection to the action of confined sulphurous-acid gas for six hours, burning one and a-half to two pounds of roll-brimstone in each 1,000 cubic feet of space, with the rags well scattered upon racks.

Full and explicit instructions have accordingly been given to Mr. George P. Pomeroy, our agent and Consul-General at Cairo, and Mr. Francis McNally, a citizen of the United States, has been designated as the inspector. He will have immediate supervision, under the Consul-General, of the process of disinfection, will be required to give the subject his earnest personal attention, and furnish a proper certificate. Mr. McNally's certificate will show the following facts:

1. His name;
2. The name of the consignee in the United States;
3. The place where the rags were disinfected; and
4. The process of disinfection, which must be one of the processes hereinbefore described.

After that the Consul-General is to authenticate the certificate given by the inspector. This process is to be observed in the case of every bale of rags, which is to be also marked, "Thoroughly inspected," with the name of the inspector.

Mr. Pomeroy has been told that, although he should not refuse to certify invoices even when lacking the inspector's certificate, he must give notice to all shippers of rags that these goods will not be permitted to enter the United States unless accompanied by such certificate.

In support of this law the Boston Board of Health immediately (April 18) passed an order that no rags coming from Egyptian ports should be passed at quarantine unless accompanied by the certificate of the inspector, authenticated by the Consul-General, in accordance with the provisions above.

CANNED FOODS.

BY JOHN P. HAWKINS, C. S., BRVT. MAJOR-GENERAL
U. S. ARMY.

[From the *American Grocer*.]

THE Army Posts throughout the United States have been for a long period, now nearly twenty years, supplied with canned articles, fruits, meats, vegetables, and preserves. Many of the posts are located where it is not possible to cultivate gardens, either on account of poverty of the soil, lack of rainfall, or rigor of climate, and, as a consequence, there is hardly a military station in the land where officers and soldiers and their families do not habitually use canned foods; and, as a class, army people are without doubt the largest consumers of canned articles, in proportion to their number, of any other in the country. While one occasionally sees an article in a newspaper telling how some one has been taken sick by reason of having eaten something from a can, yet, in all my army experience (and for many years I have been Chief Commissary of a military department, and as such had charge of supplying posts with all their subsistence), I have never known or heard of a case of canned-goods poisoning in the army.

The canned foods used are not of any particular packing, either. We buy a good article, and from any packer that will furnish a proper quality, and there is considerable competition among packers to furnish us. Nor are our canned foods purchased in any particular section of the country, but usually from the packer or manufacturer who converts the crude material into the canned article, and our points of purchase extend from Maine to Texas and from the Atlantic to the Gulf. So it will be seen that our army supply is drawn from the same sources that supply

the people at large, and that civilians and our army consume the same canned articles and under the same circumstances. I recently inquired of our medical director, Lieut.-Col. John E. Summers, Surgeon, U. S. A., a careful and skilled observer in his duties, and of large experience in his army profession, whether he had ever known of a case of poisoning in the army which might be attributed to canned goods, or whether any of his medical officers at military posts had ever reported such a case to him. To both inquiries he answered, No; he had never known or heard of such a case. As in his official capacity he has been for many years in the constant receipt of formal reports concerning the health and mortality of all the posts throughout the country, and statements as to causes operating to influence the health of every command, it would certainly follow that if ever there was a suspicion on the part of a medical officer that any canned food was the cause of a sickness or disorder, there would be every probability in favor of its being reported and known to him and to the entire medical profession of the army.

A further important fact in this connection is that soldiers often report sick to the surgeon for very trifling ailments, and as a class they are under more watchful scrutiny than any other class of people; and so if a case of poisoning, which could justly be attributed to canned goods, were ever to occur among them, even if not fatal or serious, there would be but a small chance that it would not come to the knowledge of the Post Surgeon. It would be almost an impossibility that he would be ignorant of the case and the causes.

Deductions from the foregoing may be fairly made that the reports of poisoning by eating canned food are not to be believed, or are only to be believed when it may have occurred by reason of the person having eaten from a can the food in which was evidently spoiled, and so spoiled that the appearance of the can would surely have indicated the unsound condition of its contents to a person exercising ordinary care. If a person buys tainted meat from the butcher and eats it, knowing it to be a little *off*, and is taken sick, he must blame himself for trifling with his health; and likewise if he buys canned food of suspicious appearance, he must expect to pay in health for his carelessness or temerity. Therefore, having no apprehension as to the method of packing an article, whether in tin or in glass, whether soldered with the aid of an acid, or soldered inside or outside the can, there is every reason to consider canned articles as good for food as any food can be. The experience of our army ought to be conclusive on this subject. And no person having a decent knowledge of what is good or bad, sound or unsound, could be misled into eating an improper article from a can any easier than he could be induced into eating a decayed potato or a tainted piece of butcher's meat.

Correspondence.

THE FIFTH INTERNATIONAL CONGRESS OF HYGIENE.

(From Our Own Correspondent.)

THE HAGUE, August 30, 1884.

THE Fifth International Congress of Hygiene has concluded its labors. Sanitary reformers from nearly all the centres of civilization have met, delivered speeches at one another and at the public beyond, and are now once more scattered in all directions, not to meet again till the autumn of 1886. These congresses are an interesting and at times an amusing feature of continental sanitation. They differ from the Medical Congress, which met a few days previous at Copenhagen, and will reunite at Washington, inasmuch as they open their doors to all parties in any way connected with the preservation of public health. The majority of the members are medical men, but engineers and architects are not only welcome, but take a lead in many questions. M. Emile Trélat, for instance, has utilized these congresses to propagate his theories on unilateral-light for schools; M. Durand-Claye, to urge his scheme for the drainage of Paris, while M. Herscher is the representative of the practical application of modern theories of warming and ventilating. By the side of doctors, engineers, and architects, we have public administrators, such as M. Besançon, Chief of the Second Bureau of the Paris Prefecture of Police, who is now busy organizing a staff to disinfect all private houses where cholera may find its victims, should the epidemic reach the capital of France. These heterogeneous elements, it will be readily understood, are indispensable to the practical application of public

hygiene. A doctor should know what diseases are engendered by sewer-gas, but a doctor cannot be called upon to build a sewer. A medical man may insist on even temperature and pure air in the sick room, but we cannot call upon him to build a stove or contrive ventilating appliances. In the same manner a doctor may insist on pure water-supply and on disinfection, but he could not construct the mighty aqueduct that shall transfer the distant spring-water to the crowded city, or take those police measures that shall enforce purification after infection. The medical profession in England has not thus far taken much interest in these congresses, though they have been held every two years for the last ten years with increasing success. Various governments of Europe have at each congress sent special representatives; large municipalities, universities, medical schools, sanitary societies, and numerous public bodies have taken pride in being adequately represented, but the English medical profession has, as a body, held aloof.

Fortunately, the Americans showed themselves at once more tolerant and more enlightened. The United States Army was represented by Dr. J. S. Billings and Dr. Alfred C. Girard, while the United States Navy had Medical-Director Browne and Dr. Rufus Tryon. The State Board of Michigan sent Dr. A. Hazlewood. Dr. C. F. Chandler and Dr. J. Oakley Vanderpoel were announced from New York.

The congress opened under somewhat lugubrious circumstances. I remember at the Paris Congress, held six years ago, nearly all the delegates were ill. Dr. Lory Marsh, notably, had come over to wave the banner on behalf of the British Sanitary Institute, and seemed bent on carrying all before him; but the very day the congress was opened the doctor fell ill, and kept his bed till the proceedings had concluded. Several Spanish delegates could hardly attend the meetings, and refused to make any appointments, fearing they would not be able to keep them, so ill did they feel. Other nationalities scarcely fared any better, and those that did not suffer from intestinal complaints were the victims of indigestion. If ever there was a body of men whose health required preserving it was the members of the Paris International Congress of Hygiene. "Doctor, cure thyself," might have been remarked with equal appropriateness to the sanitarians who have just met at The Hague. They had scarcely reached the political capital of Holland than they were informed by their Dutch colleagues that the town could not be illuminated in their honor, because the country was in mourning. The heir to the throne had died a few weeks previous from typhoid fever, a preventable disease. But this was not all; the President of the Congress, Sir G. T. G. Klerck, formerly a member of the Dutch Government, died last January; one of the vice-presidents had an epidemic of typhoid fever in his family, while another vice-president had just lost two children from diphtheria, and a third child was actually in the agony of death from this same epidemical and preventable disease, which all agree in attributing to bad sanitation. Another president, Dr. W. H. de Beaufort, Senator, and two other vice-presidents, had to be selected at the last moment; and, though they certainly acquitted themselves of their duties with tact and eloquence, the circumstances that led to their appointment were scarcely calculated to impress the outside public with a due sense of confidence in the power of these congresses to prevent zymotic disease. Nor had the discussions at previous congresses contributed in any very marked degree to lessen the prospects of epidemics. In any case, many men whose presence had been welcomed on former occasions, were absent this time, being retained at their homes by the presence of cholera. Among these latter, none were more regretted than Dr. H. Pacchiotti, Senator and Professor of the University at Turin. His fervid eloquence, his flowery language, would, in spite of its exaggerations, have thrown a glow of warmth on the proceedings, which at times were somewhat too northern in their quiet, stern, and cold businesslike character.

In spite of all these considerations, some three hundred members put in an appearance at The Hague, belonging to twenty-one different nationalities, and twelve Governments sent special delegates.

(TO BE CONTINUED.)

RESPONSIBILITY FOR THE COLLAPSE OF THE DETROIT SKATING-RINK.

(From a Special Correspondent.)

THE reporters of the daily press, in writing up the recent accident at the skating-rink, interviewed A. C. Varney, the architect of the building, and in the course of the interviews, he is reported to have said that he did not consider himself in any way responsible for the falling

of the trusses; that he did not design them, and, in fact, that it was not the business of an architect to design roofs of that description, and he doubted if there was an architect who would or had designed truss roofs and made himself responsible for their safety. This statement called out vigorous letters from Julius Hess and W. E. Brown, both of whom have designed and superintended the erection of numerous roofs supported by trusses. The Architects' Association passed a series of resolutions condemning Mr. Varney. Among architects and builders generally it is the opinion that Mr. Varney pursued a very foolish course in seeking to escape censure by disclaiming responsibility. The building was one of the flimsiest kind of structures, and no architect should have ever assumed the superintendence of it or had any connection with it. Mr. Varney has been deposed and his successor is E. E. Meyers.

POLLUTION OF THE POTOMAC.

(Special Correspondence of THE SANITARY ENGINEER.)

WASHINGTON, D. C., September 20, 1884.

EXAGGERATED reports have come to the Health Department about the large number of hogs (victims of the hog cholera that has spread over Virginia and Maryland in the last two months) thrown in the river and canal, and investigation proved that it was true to a certain extent, and showed the necessity for prompt action to prevent the river (which is the source from whence we get our drinking-water) from being polluted. Health Officer Townshend started up the river at noon yesterday. He succeeded in securing the steam packet-boat of the paymaster of the Chesapeake and Ohio Canal Company for the trip. His purpose is to proceed as far as Point of Rocks, and make examination of the canal and river banks. He takes men enough along with him to bury all the hogs they find, and when he arrives at Point of Rocks, if he is not satisfied with such intelligence as he may find respecting the condition of things further up, he will proceed to Harper's Ferry, and, if necessary, above there.

It is confidently expected that this prompt action on the part of the Health Officer here will prevent the pollution of the Potomac water. It is not, however, to be expected that there will be any abatement of this disease among the hogs until we have a severe frost.

THE APPOINTMENT OF SANITARY OFFICERS.

LONDON, September 5, 1884.

I WATCHED closely the proceedings of the different conferences at the Health Exhibition, especially those concerned in carrying out the duties of the different public health acts, and though there were suggestions and recommendations in abundance of more or less practical value, I think the key-note was entirely missed, and that is that the various officers entrusted with the carrying out of these duties should be appointed by the Local Government Board, and to be responsible to them only.

At present these officers are appointed by the corporations, vestries, boards of guardians, etc., requiring them, and it is to be expected that they will appoint a good, sound, practical man, who, as a part of his duties, would undoubtedly come in contact with his employers. As a matter of fact, these appointments generally fall upon persons whose sanitary acquirements, if they have any, are of a low order, and as a consequence the duties are carried out in a weak, uncertain manner, or else drift into a do-nothing course, so that these different acts, passed for the protection of the public, remain a dead letter.

What I would suggest is, that these officers be appointed by and be wholly responsible to the Local Government Board, and that larger salaries be offered than at present, so as to induce good, practical people to take office, who, by their training and experience, would be enabled to carry out their duties without fear or hesitation.

I venture to think, did the public but know a good, practical sanitarian could be consulted free at the Public Offices at certain hours, many dangerous nuisances would be freely removed, with a corresponding decrease in the death-rate.

W. SAWYER.

[The above letter presumably refers to sanitary inspectors or inspectors of nuisances. The matter is one where the Local Government Board should have more control. We heard of a case lately, in which two men applied for a vacancy as inspector for one of the London vestries. One of the applicants was a plumber of good character, and possessed fairly good knowledge of general sanitary matters; the other was a retired soldier, with a good-character sheet, and no other qualifications, *except two friends at court in the shape of vestrymen.* The retired soldier secured the berth.]

COMPOSITION FOR TRAPS.

BOSTON, September 6, 1884.

To the Editor of THE SANITARY ENGINEER:

Will you please inform me whether it is best to use pure lead, or a mixture of lead and antimony for making plumbers' traps? also, what the composition of ordinary machine-made S-traps is, whether of pure lead or of some alloy? Very truly yours, PLUMBER.

[We believe good soft pig-lead only is used.]

RUST IN A SUCTION-PIPE.

CHARLESTON, August 9, 1884.

To the Editor of THE SANITARY ENGINEER:

My pump is situated about sixty feet from the cistern, with a 1-inch iron pipe for suction, but every time the pump is used a large quantity of water has to be wasted, on account of the rust in the pipe. Would you have the kindness to let me know that if I use a tin pipe in place of the iron one if it would be perfectly safe to use the water which remains in the tin pipe overnight? Would there be any danger in using lead pipe?

Yours respectfully,

N. Z.

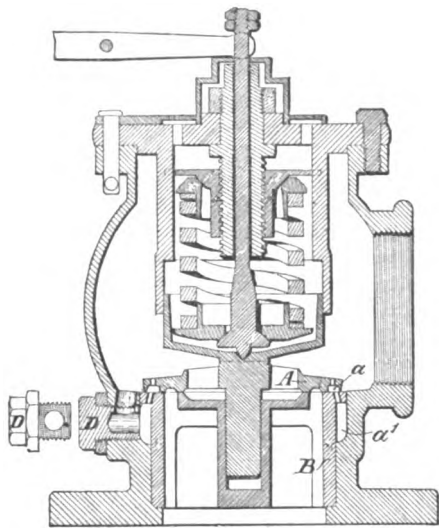
[Unless there was some peculiar character to the water, of which we have no knowledge, a tin pipe could be used safely. We should not recommend the use of lead pipe in such a case. It would probably be necessary to waste as much water as with the iron pipe now in use.]

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

SAFETY-VALVE.

OUR illustration this week represents an improved safety-valve. It relates to that class of valves called "pop-valves," and its main feature is an adjustable cock connected with the "pop-chamber," the upward pressure upon the valve being regulated by the adjustment of the cock.



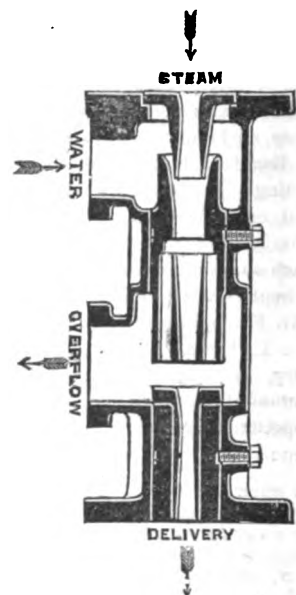
In the drawing, *a* and *a'* represent the pop-chamber. The steam escapes through the annular aperture under the disk *A* and over the edge of the bushing *B*, and in escaping enters the chamber. This pressure, acting on the greater area of the disk thus exposed to it, helps to force it further from its seat, giving an increased passage for the escape of steam. To secure different degrees of pressure in the pop-chamber, the cock *D* is provided, when the holes shown through the disk *A* may be reduced or omitted, and the regulation secured by the adjustment of the cock, allowing the desired quantity of steam to escape this way.

The inventor is Mr. Henry G. Ashton, of Somerville, Mass.

INJECTOR.

WE take from *Engineer* the accompanying illustration of an improved automatic injector. This injector has the important advantage that if "knocked off" by a jerk, as when an engine is running over points or crossings, it will automatically restart itself, instead of having to be restarted by hand. The receiving or delivery cone is made to slide freely in its bearing, so that when steam is turned on it passes through and around the combining-cone, thus creating a partial vacuum in the water-pipe, and so lifting the water. When the water comes in contact with the steam

condensation takes place, thus centralizing the jet of steam and water, which then passes through the combining-cone only, and then on into the receiving-cone, creating sufficient pressure below the latter to force it up until it comes in contact with the bottom of the combining-cone. Should



the injector cease to work from shortness of water, or any other cause, the steam forces the receiving-cone away from the combining-cone, when the same action takes place as before, and the injector restarts itself without any manipulation, and is thus automatic.

The sealing of the overflow from the atmosphere is an advantage, as it enables the injector to work freely with hot water, without the necessity of closing the overflow by mechanical means. It is said this injector will lift water fifteen feet. It is the invention of Mr. Gresham, of the firm of Gresham & Craven, Manchester, England.

Reviews of Books.

PUBLIC HEALTH. The practical guide to the Public Health Act, 1875, and correlated Acts, for the use of Medical Officers of Health and Inspectors of Nuisances. By Thomas Whiteside Hime. 207 pp. 16mo. London: Ballière, Tindall & Cox. 1884.

This is a convenient little hand-book containing those portions of the Public Health Act of 1875 which more especially concern the work of sanitary officials, and also abstracts of the Sale of Food and Drugs Act, the Rivers Pollution Act, the Canal Boats Act, the Factory Act, the Infant Life-Protection Act, and one or two other acts the provisions of which are of interest to Medical Officers of Health. Some useful tables, a list of the officers of the Local Government Board, etc., are given, and there is a full index, the whole forming a handy manual which sanitary officials will find very useful.

BOROUGH OF LEICESTER. Annual Report of the Health and Sanitary Condition of the Borough for 1883. By Wm. Johnston, M.D., Medical Officer of Health. 74 pp. 8vo.

As in most other localities in England and this country, the death-rate of Leicester for the year 1883 was less than in 1882, being 19.2 per 1,000. This corresponds as usual to a diminution in the prevalence of zymotic, and especially of infectious diseases. As Leicester is one of the places where compulsory notification of cases of infectious diseases is required of medical men, Dr. Johnston's report of the results obtained during the four years in which this has been enforced is of special interest. He states that the evils anticipated by the profession have not been realized, that no instance has come to his knowledge where notification has in any way disturbed the relations existing between a medical man and his patient, and that the profession now fully co-operate with the health committee in this matter. The total number of such notifications in 1880 was 1,582; in 1881, 1,892; in 1882, 1,396; and in 1883, 1,241. The diseases notified are scarlet fever, erysipelas, typhoid fever, diphtheria, puerperal fever, small-pox, and typhus fever. It is claimed by the health officer that this system of notification has exercised a powerful influence in preventing the spread of scarlet fever. This may be true, but the figures do not prove it. In 1880 there were 802 cases of this disease; in 1881, 1,065; in 1882, 763, and in 1883, 797. Diphtheria has, however, steadily diminished, the figures for the four years being 87, 63, 38, and 26. Appended to the report are some interesting tables, and a good map of the borough, showing sewers, and deaths from certain diseases by localities.

PEST-HOLES IN NEW YORK.

No. I.

THE accompanying sketch illustrates the condition of affairs as seen by one of our staff on the premises No. 72 Greenwich Street, said to belong to the Estate of Edward Burke, and mentioned in our editorial of this date. The building is a 4-story double tenement-house, 37 feet, or thereabout, front, by 50 deep, the first story covering the whole lot by extensions.

In the basement are the privies, as shown, composed of three seats over a school-sink. Adjacent to these are the wood-sheds, which are too filthy to use for their legitimate purposes, and are made privies of by the multitude which uses the premises. To the right of this, in the same cellar or basement, is a room used as an intelligence office for the lower class of emigrants. No light or air can enter this cellar except by the doors and two small windows under the area-grating, which are obstructed. Immediately over the privies (on the street floor) is a butcher-shop. The apparent condition of the shop itself is good, but its juxtaposition to that part of the cellar used as a common privy by about 200 persons in a day, reeking with human filth and filled with myriads of little flies, may throw some doubts on the desirability of the location for a dispenser of food for hu-

SENSITIVENESS OF THE EYE TO COLORS.

At the recent meeting of the American Association, Dr. E. L. Nichols, of Lawrence, Kan., gave the results of some interesting experiments on the sensitiveness of the eye. He mixed red-lead, chromate of lead (yellow), chromic-oxide (green), and ultramarine (blue), with a white powder, so as to form with each color a series of mixtures in which the proportions of pigment to the white powder were respectively 1:1, 1:2, 1:4, 1:8, and so on. Fifty-four persons were tested as to the least quantity of coloring matter which they could recognize as giving a hue to the white powder, with the following results:

	Red-lead.	Lead-chromate.	Chromic-oxide.	Ultramarine.
Average for 31 males.....	15.9	17.3	817.7	148.5
Average for 23 females....	39.8	33.2	913.6	108.1
Average for both sexes...	25.2	25.9	864.3	126.5

As will be seen, the male observers showed measurably greater sensitiveness to all colors excepting blue, and their superiority increases with the wave length, being greatest in the red. Both sexes showed a marked deficiency in their power to detect the presence of green, a result possibly of

THE NEW YORK SANITARY REFORM SOCIETY AND HUNTER'S POINT NUISANCES.

THE Sanitary Reform Society, James Gallatin, President, has just issued a circular calling attention to the good already accomplished in abating the Long Island nuisances, and asking aid in further work in the same direction. It is stated that in the recent heated term about 1,000 sick and poor people, some of them in maternity wards, have had the air shut out from them because the Charity Hospital on Blackwell's Island has been directly to leeward either of Newtown Creek or of offensive neighborhoods in our own city. All residents near the districts complained of are earnestly requested to keep memoranda of the hour of any day or night when stench is perceived, the direction of the wind at the time of observation, and the intensity of the odor as "slight" or "strong" or "very strong." The place of observation should in every instance be noted, whether at the observer's own house or elsewhere; and if using the elevated roads, the streets passed from which the stench comes. Complaints founded on such observations and memoranda should be forwarded to the Sanitary Reform Society, 71 Bible House.

WORK OF THE PARIS MUNICIPAL LABORATORY.

THE following table gives the more important food articles examined at the Paris Laboratory during August, together with the number of samples reported as good:

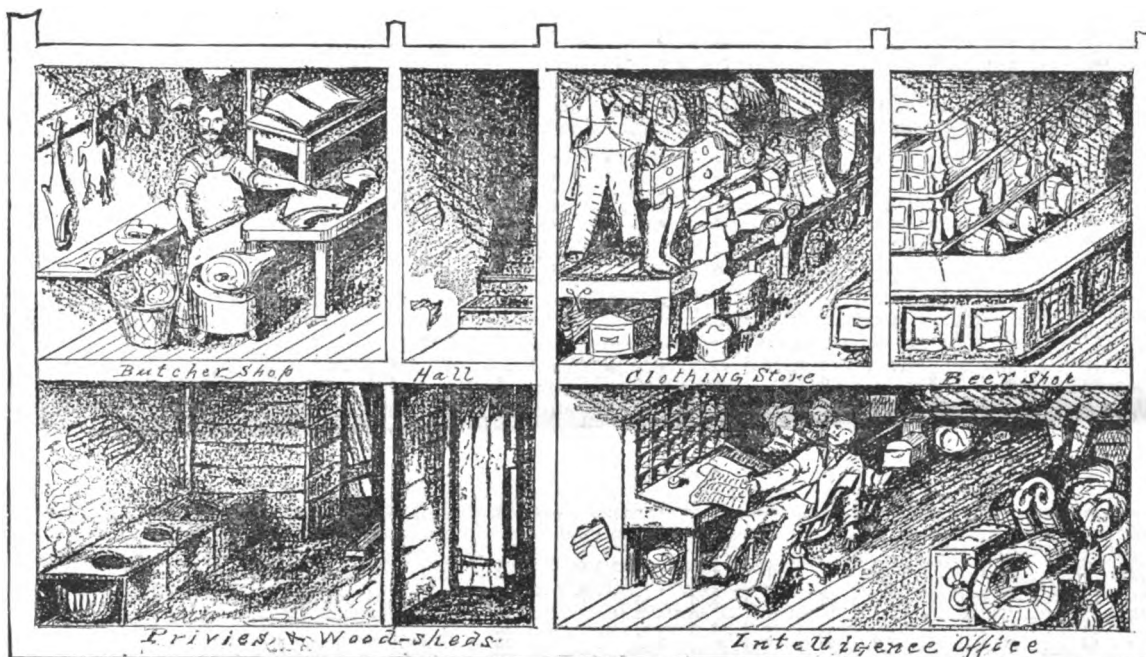
	Total No. Examined.	No. Reported as good.
Wines.....	463	76
Vinegars.....	9	7
Beers.....	14	9
Ciders.....	6	6
Alcohols.....	8	8
Syrups.....	5	1
Waters.....	107	2
Milks.....	394	226
Butters.....	21	21
Oils.....	11	11
Flours.....	19	17
Chocolates.....	7	6
Coffees and Teas.....	6	6

AT Bristol, England, lately, a woman kept a lodging-house, the ground floor of which was eighteen inches below the street and liable to be flooded by every rain. The place was dilapidated and the ventilation bad, so much so that the authorities refused to register it as a lodging-house. The Inspector of Nuisances complained that he found twenty-four persons of different names lodging there, including beggars, tramps, and laboring people, there being men and women in the same room, and that some of the beds were slept in continuously—one lodger at night and another in the daytime. It being the first case that was adjudicated on in that court under the by-laws of the Public Health Act, she escaped with a fine of 40s. and costs, and was warned that if she continued to break the provisions of the act she would be liable to a fine of 40s. per day while she persisted in her practice.

THE Bromley, England, sanitary authorities ordered the owner of certain cottages to provide a "sufficient water-closet" for each of them. In one of the houses he so far obeyed the notice of the board as to erect a closet in the place of the open cesspit which formerly existed, but he failed to provide adequate water-supply, the important item of flushing being dependent upon persons using a pailful of water instead of the usual water-cistern supply. This being deemed insufficient by the board, it finished the work at a cost of £3 7s., and sued him for that amount. After hearing the evidence and arguments of counsel, the court made an order for the amount claimed and payment of court fees, 7s. 6d.

COLONEL BOLTON, the examiner of the London water-supply, reports that during July the Thames water supplied by the Metropolitan Water Companies was, for river water, remarkably free from organic impurities.

CHOLERA PRECAUTIONS IN IRELAND.—The *Dublin Gazette* of September 7 contains regulations for the prevention of cholera, directing that from October 1 no rags from Italy or France shall be delivered overside except for purposes of export, nor landed in any port or place in Ireland.



CELLAR AND FIRST FLOOR OF TENEMENT-HOUSE No. 72 GREENWICH STREET.

man beings. Next to the butcher is a clothing-store, the rear of which is used for a dwelling, and which is partly over the cellar in which the privies are located. Then comes a "bier-saloon," in the rear of which the family lives. On the second floor is a German lodging-house for emigrants. In it there are twenty-two beds, with an acknowledged twenty-five adults and three children. Above this are two floors let principally to Irish families, there being four families to a floor.

It is said the lodgers on the second floor use the sink in the hall as a urinal. The women and children on the two top floors are forced to use vessels, and discharge the contents at night in the vicinity of the privies under the butcher-shop. The condition of the privies and their surroundings shown—which are the only ones for the building, and which are resorted to by the *habitués* of the saloon and intelligence office, and by as many from the street as wish to use them—is past cleaning. Layer after layer of sawdust has been thrown on the places most exposed to view, but it only serves to increase the filth and deceive the unwary. To escape this state of affairs the wood-sheds and passage beyond are resorted to by some more particularly as urinals, until the earth has become saturated and impervious to the passage of water, so much so that the ground is covered at places an inch deep.

We have other descriptions of similar places, which will be given in subsequent issues.

THE twenty-fifth annual report of the Metropolitan Drinking-Fountain and Cattle-Trough Association of London announces the erection of fifty-two new troughs for animals and fifty-one new fountains for human beings. Most of the structures of the society are examined and cleaned by its servants three times a week.

the continued exposure of the eye to that color (in foliage, etc.), and consequent enfeeblement of the nerves corresponding to green.

In the detection of shades of saturation the gentler sex showed a decided superiority in all parts of the spectrum, and both sexes were most successful with the color (green) for which the eye has been found most efficient in sensitiveness. This would seem to indicate that the power to perceive colors of very low saturation depends upon the delicacy of the eye, while the ability to detect differences of shade is the result of practice.

ANDREW YOUNG, President of the National Association of Master Plumbers, has been appointed by the Governor of Illinois special commissioner from that State on the sanitary exhibit at the New Orleans World's Fair.

THE Board of Health of Paterson, N. J., on September 9 adopted an ordinance providing, under a penalty of \$50, that "no person or corporation shall throw, cast, place, or deposit, or allow to run or flow into the Passaic River above the falls, or into any brook or stream which flows or runs into said river above the falls, or on any street the grade of which tends toward the said river above the falls; or into any well or reservoir, any dead animal or any part of the same, or any manure or compost, or slops, or refuse from any factory, or any foul or obnoxious substance whatever, or any substance that will in any way pollute or render hurtful or obnoxious the water of said river, brooks, streams, wells, or reservoirs," and making it the duty of the Health Inspector to examine public and private wells from time to time, and to order such as he shall judge dangerous to public health to be closed and disused, under a penalty of \$25 fine.

death, typhoid fever 1, diphtheria and croup 7, whooping-cough 4, diarrhoeal diseases 96, consumption 32, and violence 6.

RUSSIA—*St. Petersburg*.—August 10-16: Deaths, 482; annual death-rate, 28.1 per 1,000. Measles caused 8 deaths, scarlet fever 5, typhoid fever 20, diphtheria 12, whooping-cough 3, diarrhoeal diseases 129, and acute lung diseases 51.

DENMARK—*Copenhagen*.—August 20-26: Deaths, 129; annual death-rate, 25.1 per 1,000. Measles caused 2 deaths, diphtheria 1, whooping-cough 6, typhoid fever 1, diarrhoeal diseases 29, consumption 10, acute lung diseases 10, and violence 5.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Sept. 20.....	23.26	18.06	22.10	28.45	27.57	18.23

E. G. LOVE, Ph.D., *Gas Examiner*.

ACCORDING to the *Journal des Chamber de Commerce*, there are 610 gas-works in France; 1,300,000 tons of coal were used the past year, and the consumption of gas was 430,000,000 cubic metres.

MR. THOMAS FLETCHER, F. C. S., of Warrington, England, has invented an improved gas tubing, which consists of two layers of rubber with tinfoil between them. It is claimed that this tubing is perfectly gas-tight and entirely free from odor, while being at the same time flexible.

THE Brush Electric-Light Company, having been convinced that it is impossible to light the city of Detroit with seventy-two towers, is erecting more towers. The company asserts that 200 towers will be built, if necessary, to satisfactorily light the city.

MR. W. E. GARFORTH has invented an improvement in the Davy safety-lamp, which consists of a small rubber ball by which a sample of suspected air can be drawn from any part of the mine. The air so obtained is then forced through a small tube on the flame, when the presence of gas is immediately detected.

SPEAKING of the electric-lighting at the International Health Exhibition, the *Engineer* says: "With such an installation as that at the Health Exhibition before us, it is impossible to believe that electric-lighting can be a failure. It must grow on the public, and we would encourage engineers and electricians alike to be of good heart, to waste no time in regretting the past, but to go on continually strengthening and improving their position, so that they may render that which is now somewhat of an expensive luxury, as cheap, as common, and as accessible as gas."

THE London *Standard* thus describes the large gas-holder of the Surrey Gas Company: "It is the largest one in the world, being a telescopic holder of the newest shape. The framing which surrounds the holder and keeps it in its position is 160 feet high, and consists of wrought-iron uprights, with five tiers of struts and ten sets of diagonal braces. The tank is 218 feet in diameter, and 55 feet 6 inches in depth; the inner holder, 53 feet 6 inches deep, and 208 feet in diameter; the middle lift, 53 feet 3 inches deep, and 211 feet in diameter; and the outer lift is 53 feet deep and 214 feet across, and altogether its capacity is equal to the storage of nearly 5,500,000 feet of gas."

ACCORDING to the report of the gas inspector of Washington, for the year ending June 30, the average illuminating-power of the gas supplied by the Washington company was 17.40 candles, and that of the Georgetown company 16.90 candles. The gas of the former company was below the standard of 16 candles on four occasions, while the Georgetown company was below the standard on eighteen occasions. The legal limit of ammonia was exceeded on forty-four occasions by the Washington company, and on fourteen occasions the Georgetown company had more sulphur than the law allows. Of 1,240 meters inspected during the year, 88 registered fast against the consumers, 192 registered slow against the company, and 71 did not register the gas passing through them.

Notes.

CONSTRUCTION.

BOWLING GREEN, KY.—James H. Wilkerson, Superintendent of Water-Works, advertises for proposals until October 15, 1884, for furnishing, building, and erecting complete one compound condensing steam pumping-engine of 2,500,000 U. S. gallons capacity per twenty-four hours; and also for a non-compound condensing-engine of like capacity.

HAMILTON, ONT.—The system of brick and pipe sewers is proposed to be extended 46 $\frac{1}{2}$ miles, of which 8 $\frac{3}{4}$ miles are to be brick sewers. There is also proposed an extension of the Ferguson Avenue sewer, making a total of 47 miles of new sewers, at an outlay of over \$500,000. This is recommended in the report of Mr. Keefer, a Montreal engineer consulted by the City Council.

ATLANTA, GEO.—Work has begun on the artesian well, and on September 15 the well was 90 feet deep, being 31 feet in the granite, with 60 feet of water in it.

WASHINGTON, D. C.—Analysis of bids for constructing a new station-house on Fifth Street, between M and N Streets, north-west: J. Fearson, \$11,993; F. Baldwin, \$10,895; R. W. Darby, \$14,900; C. Thomas, \$12,200; J. H. Howlett, \$12,500; J. H. Edelin, \$11,850. No award was made.

MADISON, WIS.—Water-mains to the extent of 5,577 feet were laid between June 16 and August 21. Next month 550 feet to be laid on Dayton Street will complete the additions for the year, making a total of a mile and a quarter.

RUTLAND, MASS.—The Springfield *Republican* says that three new suits have been brought against the village, claiming damage on account of defective sewers: Marshall Deragon, for \$2,000; administrator of Wallie Deragon, for \$10,000; W. W. Tower, for \$2,000.

BOSTON, MASS.—The new City Architect, Mr. Vinal, has several new buildings in course of erection, including several school-houses, a fire-alarm repair shop, addition to Police Station No. 5, new buildings on the Austin Farm, House of Correction, and Chestnut Hill Reservoir. Plans are being drawn for an engine and police-station on Boylston Street, a ladder and hose-house in Charlestown, and a nurses' dormitory at the City Hospital.

AT Olcott Falls, on the Connecticut River, a submarine blast was fired on September 10 of 650 pounds of dynamite, in 42 holes 14 feet deep. A mass of rock 66 feet long and containing nearly 500 cubic yards was thrown 40 feet in the air and fell in deep water.

A CONTRACT to erect and furnish poles and equipments for a sixty-mile telephone line from Hoboken to Trenton has been given to Richard Chaplin of Drakesville, N. J.

JEFFERSON CITY, MO.—No award has been made on bids for stone and brick-work of post-office. Prices for stone exceed the appropriation, and it is possible that the entire work may be done in brick, in which case new bids will be asked for.

CINCINNATI, O.—The *Commercial-Gazette* says that the Newark Filtering Company proposes to the water-works authorities of Cincinnati to attach its filters and run them for sixty days, and if at the end of that time these filters shall pass the regular supply of 5,000,000 gallons daily, clear as crystal, with impurities eliminated, the city shall pay them \$50,000 for their works. They make a proposition for the Third Street works, 10,000,000 gallons per day, of \$100,000. For the Covington works three filters, each twenty feet in diameter, will be required. For the reservoirs here filters forty feet in diameter would be needed.

ST. LOUIS, MO.—(Special Correspondence.) Builders are feeling jubilant. They claim business is good. In addition to the list of building permits given, all over \$5,000, there were fifty others issued, ranging from \$500 to \$4,500. Permits are being issued now at the rate of \$120,000 per week; some weeks more. Last week \$125,000 was its amount. In addition to this, \$100,000 is spent each week in repairing and improving. St. Louis is not especially booming in the building line, but all seem to be busy. Plumbers are all exceptionally busy just now. There are in St. Louis ninety boss plumbers, and each shop employs three or four men, making altogether about 400 plumbers in the city. Business is good with them. In addition to new business, water is being extended and admitted into many houses.

The plumbers (bosses) met last week. There are about ninety members of the association, and it is a very active body. Nothing but routine business was transacted.

ANSONIA, CONN.—The contract for building new sewers has been awarded to P. F. Brennan, of Waterbury, Mr. Austin claiming that there was a mistake in the figures as received by telegraph.

PROVIDENCE, R. I.—For the new bridge at India Point, crossing the Seekonk River and connecting Providence with East Providence, Messrs. Smith & McGaw are contractors for the stone abutments; the cast-iron cylinders for pier-caissons are furnished by the Builders' Iron Foundry, and Anderson & Barr are superintending the sinking of the caissons. The bridge is of the "pneumatic cylinder-pier" description.

BROOKLYN.—Altogether \$30,000 has been spent under the emergency clause of the city charter, for filling up the dangerous sunken lots of the city. The last expenditure of \$5,000 has just been authorized by Acting Mayor Olean, under the requisition of Health Commissioner Raymond.

GOVERNMENT WORK.

KNOXVILLE, TENN.—A. H. Linthal has been awarded the contract for painting, varnishing, and bronzing in Post-Office and Custom-House, at his bid of \$2,700.

ST. LOUIS, MO.—Synopsis of proposals for furnishing 30,000 pounds of wire, size No. 12 (Birmingham gauge), at Engineer's Office, St. Louis: Ludlow-Saylor Wire Co., St. Louis, \$930; Isaac R. Adams, St. Louis, \$960; Merchants' Barb-Wire Manufacturing Co., St. Louis, \$975; M. M. Buck & Co., St. Louis, \$1,050; John H. Roebing's Sons & Co., Trenton, N. J., \$1,050; H. L. Fox & Co., St. Louis, \$1,260. Contract awarded to the Ludlow-Saylor Wire Co.

BALTIMORE, MD.—Dredging under the last (\$250,000) appropriation has been resumed. Eleven large machines are being used. The channels are to be made 325 feet in width.

CALUMET HARBOR, ILL.—The Calumet and Chicago Canal and Dock Co. bid as follows for materials and labor for improving harbor: Hemlock timber, 87,337 ft. b. m., \$23; pine timber and plank, 27,000 ft. b. m., \$25; pine piles, 40, \$10.50; wrought-iron drift-bolts, 11,351, 85 pounds, 3 $\frac{1}{4}$ c.; wrought-iron screws, bolts, nuts, and washers, 640 pounds, 3 $\frac{1}{2}$ c.; wrought-iron spikes, 150 pounds, 3 $\frac{1}{2}$ c.; stone, 246,804, 1,000 cords, \$8.25; cost for 100 linear feet, \$5,536.47; cost for 200 linear feet, \$11,072.94. These bids were accepted.

NEW HAVEN, CONN.—John Beatie, of Leetes Island, was the only bidder for 28,000 tons of rip-rap granite for the extension of the New Haven breakwater. Contract awarded at \$32,760.

CHARLESTON HARBOR, N. C.—Proposals for improving harbor: P. Sanford Ross, \$282,950; Rittenhouse Moore, \$308,250; John F. Gaynor, \$239,900; William H. Browne, \$286,608; A. A. Howlett, \$230,500. Contract awarded to A. A. Howlett.

COLUMBUS, O.—Contract for iron-beams, columns, etc., for the court-house has been awarded to L. M. Morris, who bid \$8,998.90. Other bids have been already given.

HARRISBURG, PA.—Contract for frescoing and decorating post-office, etc., awarded by the supervising architect to E. S. Miragol, for decorating the corridors of the first and second story, including ceiling, \$2,500, and to Fr. Beck & Co., for decorating the postmaster's rooms, first story \$500, and small rooms, second floor, \$500.

CUMBERLAND SOUND, GEO.—Bids for improving harbor: Atkins & Hoffman, mattress, 67c. square yard; stone, \$3.48 cubic yard; aggregate, \$57,710. Levi S. Burrows, mattress, 74c.; stone, \$3.49; aggregate, \$59,850. J. H. Staats, mattress, 69c.; stone, \$3.35; aggregate, \$56,860. Lara & Ross, mattress, 59c.; stone, \$3.09; aggregate, \$51,100. Lara & Ross awarded contract.

BRUNSWICK, GEO.—Bids for improving harbor: John S. Howell, mattress, 73 $\frac{1}{2}$ square yards; stone, \$3.09 cubic yard; aggregate, \$6,981; Atkins & Hoffman, mattress, 65c.; stone, \$3.48; aggregate, \$7,631. Contract awarded to John S. Howell.

NEW YORK, N. Y.—Contract for furnishing four mail elevators for the New York Post-Office has been awarded to N. B. Cushing, who bid \$6,200. Abstract of other bids has been given.

WASHINGTON, D. C.—Synopsis of bids for construction of annex to Soldiers' Home, opened by Major Rittenhouse: Langley & Gettinger, \$73,000; C. Thomas, \$66,500; John H. Howlett, \$72,300; M. M. Magruder, \$73,440; Wright & McDermot, \$65,795; Joseph Driscoll, \$69,565; William Henderson, \$74,450; Bright & Humphrey, \$72,870; Walsh & Co., \$67,997; John H. Edelin, \$72,875; S. D. Phillips, \$72,500. Award not yet made.

DALLAS, TEX.—Bids for stone and brick work, opened in Supervising Architect's office September 12: A. Brownlee, stone \$27,077, brick, \$15,390; Morgan & Morris, stone \$38,000, brick \$27,000; Figh & Sanderson, brick, \$17,900; M. A. McGowan, stone \$37,500, brick \$14,990.

ST. LOUIS, MO.—Bids for delivering 50,000 cubic yards of rip-rap on board Government barges in the Mississippi, 100 miles from St. Louis: Glenwood Lime and Quarry Association, St. Louis, \$23,686.67; Grafton Quarry Company, \$22,500; Martin Lorenz, St. Louis, \$29,250. Contract awarded to Glenwood Lime and Quarry Association.

ST. JOHNS RIVER, FLA.—Bids for improving channels over the bar at mouth of river: John F. Gaynor, mattress, 69 cents square yard, stone \$3.59 cubic yard, aggregate \$138,050; A. A. Howlett, mattress 75 cents, stone \$3.10, aggregate \$130,000; Henry S. Ely, mattress 65 cents, stone \$4, aggregate \$145,500; William H. Browne, mattress 77 cents, stone \$4.48, aggregate \$165,900. Contract awarded to A. A. Howlett.

LEWES, DEL.—Only one bid was received by Superintendent S. J. Kimball for constructing a boat-house for life-saving station, that of J. B. Hudson and J. F. Lark, of Wilmington, Del., at \$2,480. Rejected.

JACKSON, TENN.—Contract for masonry and carpenter-work of court-house, etc., has been awarded to J. M. Marshall, who bid \$27,977.

SAVANNAH, GEO.—Synopsis of bids for stone and mattress for improving harbor: Rittenhouse Moore, mattress, \$1.35 per square yard; stone, \$3.40 per cubic yard; aggregate, \$129,350. P. Sanford Ross, mattress, 57c. per square yard; stone, \$3.30 per cubic yard; aggregate, \$119,250. John F. Gaynor, mattress, 47c. per square yard; stone, \$3.05 per cubic yard; aggregate, \$119,250. Contract awarded to John F. Gaynor.

POTOMAC RIVER.—Bids for dredging 1,000,000 yards of material from Virginia Channel of Potomac River: Benson & McNee, San Francisco, 13.45c. per cubic yard; measured in place. National Dredging Company, Wilmington, Del., 21c.; measured in scow. Moore & Wright, Portland, Me., 24c.; measured in scow. Morris & Cummings Dredging Co., New York, 25c.; measured in scow. Ross & Sanford, Jersey City, 16.3c.; half scow measurement, half in place. American Dredging Company, Philadelphia, 21c.

NEW STATION-HOUSE FOR POLICE, DISTRICT OF COLUMBIA.—Synopsis of bids opened September 16, 1884: J. Fearson, \$11,993; F. Baldwin, \$10,895; R. W. Darby, \$14,000; C. Thomas, \$12,200; J. H. Howlett, \$12,500; O. H. Edelin, \$11,850.

MEMPHIS, TENN.—The District Board of United States Engineers opened bids on September 15, for levee work on the Tensas front, for construction and repairs of levees from Delta to Bradford (about 24,000 cubic yards), and from Raleigh to Willow Point (about 186,000 cubic yards). The award was made to George Arnold & Co., Memphis, at 18 $\frac{3}{4}$ cents per cubic yard from Delta to Bedford, and at 17 $\frac{3}{4}$ cents from Raleigh to Willow Point. Other bids were: J. C. Neely, Bardwell, Ky., Delta to Bedford, 23c., to begin five days after receiving contract. Same, Raleigh to Willow Point, 21c., to begin five days after entering contract; John McGinty, New Orleans, La., Delta to Bedford, 24 $\frac{1}{2}$ c.; Raleigh to Willow Point, 18 $\frac{1}{2}$ c. R. G. Hunston & Co., Glendale, O., Delta to Bedford, 24c., to begin five days after contract. John B. Neely & Co., Chattanooga, Raleigh to Willow Point, 21 $\frac{1}{4}$ c., to begin five days after contract. Donnelly & Co., Memphis, Delta to Bedford, 25c., ten days after contract; Raleigh to Willow Point, 27c. Frein, Bambruck & Co., St. Louis, Delta to Bedford, 27c.; Raleigh to Willow Point, 28c. F. S. Maxwell, Mounds, La., Delta to Bedford, 21 $\frac{3}{4}$ c. Winters & Cooney, Memphis, Raleigh to Willow Point, 21c. Harny & Flynn, Memphis, Delta to Bedford, 21 $\frac{1}{2}$ c., to begin three days after signing contract; Raleigh to Willow Point, 17 $\frac{3}{4}$ c., to begin three days after signing contract. John

B. Reid, Vicksburg, Delta to Bedford, 19c. Dan. T. Hartwell & Sons, Memphis, Raleigh to Willow Point, 27c. Robert Johnson, Memphis, Delta to Bedford, 25 $\frac{3}{4}$ c. John S. McTigh, Little Rock, Ark., Delta to Bedford, 28c.; Raleigh to Willow Point 26c. Montgomery & Nicholson, Louisiana, Raleigh to Willow Point, 17 $\frac{3}{4}$ c. Luke Madden, 23 $\frac{3}{4}$ c. and 7c. a yard for clearing and grubbing; thrown out.

BALTIMORE.—The office of Lt.-Col. William P. Craighill, U. S. Engineers, has been removed from 70 Saratoga Street, to 378 St. Paul Street.

CUSTOM-HOUSE, ETC., MIDDLETOWN, CONN.—Synopsis of bids for steam-heating apparatus opened September 19, 1884: James Donovan, \$1,057, October 31; Kelley & Jones, \$1,549, 6 weeks; Stalworth Mfg. Co., \$1,279, 6 weeks; E. E. Gold & Co., \$1,880, 60 days; Universal Steam-Heating Co., \$1,895, 6 weeks; S. J. Pope & Son, \$2,061, October 31; Bartlett, Hayward & Co., \$1,800, 6 weeks.

NEW HAVEN, CONN.—Contracts as follows were awarded by Col. McFarland, September 22, in accordance with proposals recently advertised: Dredging the mouth of the Connecticut River, 40,000 cubic yards, A. J. Beardsley, Bridgeport, 15 cents per yard. Pile dike extension, 400 feet, New Haven Harbor, James Dubois, New York, \$21.50 per foot. Ten thousand tons stone, west jetty at Saybrook, John Beattie, Leeds Island, \$1.24 per ton. Extension breakwater at Greenport, Long Island, 7,000 tons stone, Charles H. Edwards, Boston, \$1.38 per ton. Dike in Thames River, 20,000 tons stone, Charles H. Edwards, Boston, \$1.07 per ton.

POST-OFFICE AND COURT-HOUSE, SYRACUSE, N. Y.—Synopsis of bids for stone-work and brick-work of superstructure, opened September 19, 1884:

* Two samples of brick-work submitted.	STONE-WORK.		TIME.	BRICK-WORK.
	All Limestone.	Limestone with brownstone trimmings.		
Hughes Bros.	\$6,970	500 days	\$2,400	
O'Brien & Hoollan.	65,000	360 days	22,700	
Dickson & Crabtree.	75,500	360 days	22,700	
M. A. McCowan.	69,280	360 days	22,700	
W. R. & W. Haven.	66,000	360 days	22,700	
John Moore & Co.	66,000	360 days	22,700	

Association News.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—At the meeting of September 3, in New York City, Vice-President William H. Paine presided. After electing a number of new members and associates, a paper was read by Edmund B. Weston, M. Am. Soc. C. E., giving the description and result of experiments, at Providence, R. I., on the flow of water through a 2 $\frac{1}{2}$ -inch hose and through nozzles of various forms and sizes; also giving the results of experiments as to the height of jets of water. At the meeting of September 17, a paper giving results of experiments with rain-gauges, differently located, and of experiments as to the ratio of depth of snow to the depth of same when melted, by Edmund B. Weston, M. Am. Soc. C. E., was read.

AMERICAN FORESTRY CONGRESS.—The opening session was held at Saratoga on September 16, some 250 persons being present. Dr. George B. Loring, of the Commission of Agriculture, made the opening address, insisting on the necessity of protecting the forests and of congressional action to that end.

SANITARY INSTITUTE OF GREAT BRITAIN.—The meeting will open at Dublin this year, the inaugural address being by Sir Robert Rawlinson, C. B., on September 30. Sessions will continue until October 4. The congress is divided into three sections, the first, "Sanitary Science and Preventive Medicine;" the second, "Engineering and Architecture;" and the third, "Chemistry, Meteorology, and Geology." Of the first section, the president is the

Registrar-General for Ireland, Mr. Thomas W. Grimshaw, M. A., M. D.; in the section of "Engineering and Architecture" the president is the engineering inspector of the Local Government Board for Ireland, Mr. C. D. Cotton, C. E.; and the president of the section of "Chemistry, Meteorology, and Geology" is Mr. C. A. Cameron, M. D., the City Analyst and Superintendent Medical Officer of Health for Dublin.

PUBLIC HEALTH ASSOCIATION.—The annual meeting will convene at St. Louis, Mo., on October 14, and will continue four days. A conference of State boards of health will be held at the same time and place, and will be presided over by the Hon. Erastus Brooks, of New York.

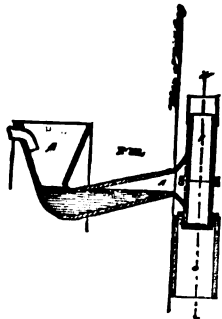
SANITARY COUNCIL OF MARYLAND.—The annual meeting was held at the Blue Mountain House, beginning with Wednesday, September 17. Among the papers read were those by Dr. John Morris, on the "Necessity of a Morgue" in Baltimore; by Dr. Chancellor, on "Typhoid Fever in Elkton;" by Dr. A. B. Arnold, on "The Relation of the Medical Profession to Sanitary Work," which aroused an animated discussion on the subject; by Dr. E. M. Schaeffer, on "Quackery and Patent Medicines;" by Mr. James R. Brewer, on "The Press and Sanitary Work;" by Dr. J. F. Hancock, on "Relations of Pharmacy to Hygiene;" Dr. St. George W. Teackle, on the "Disposition of the Dead," and by Colonel George E. Waring, on "Irrigation as a Process for Purifying Sewage."

THE CHICAGO MASTER PLUMBERS met September 17, Vice-President T. C. Boyd presiding, William Oliphant secretary, and about 100 members present. For the Committee on License, Andrew Young reported what he considered an important compact with the Commissioner of Public Works, to the effect that hereafter any plumber recommending another man for a plumber's license must go personally to the City Hall and make a formal and written affidavit. After discussions on the relative merits of iron pipe and tile for house-drainage, the whole subject being recommended to the Sanitary Committee, Librarian Murray reported the accession of 115 more books to the shelves of the library; Chairman Hamblin, of the Committee on Credentials, reported entire concurrence and unanimous signatures on the part of those gentlemen in support of the plumbers' new determination to advance no more money for street openings; and W. H. Milne was elected a member. Then President Andrew Young, of the National Association, read affidavits by Brooklyn and New York plumbers to the effect that they knew positively that the "Baltimore resolutions" were not only read, but handed to the New York meeting of manufacturers. These affidavits, the speaker held, officially branded as falsehoods the repeated denials of that fact by the manufacturers. Mr. Young proceeded to say that letters continued to come in from the latter, recalling privately all indorsements of the manufacturers' manifesto, and ratifying the Baltimore resolutions. Others present said that like representations were being made all over Chicago by drummers for Eastern houses, the common representation being that "the whole thing had been a mistake, at least as regarded their firm." "Are they to retract privately and individually, or in the same public way they have sent forth their repeated insults, the latest of which is this letter to the architects?" was asked. Another conundrum propounded was, "Must not the Executive Committee now stand by the New York and Brooklyn resolutions as much as those of Baltimore?" In behalf of the Executive Committee, a majority of whom—being residents of Chicago—were present, it was declined to go further into the catechism business, they being responsible only to the assemblage that should meet at St. Louis next June.

THE BOSTON MASTER PLUMBERS' ASSOCIATION met at its rooms September 18, Mr. Isaac Riley, president, presiding. After the regular business was transacted the late New York trouble was brought up. Nearly every member relieved his mind by denouncing a certain few of the New York dealers and manufacturers, who, as was stated, intentionally misrepresented the trade in the public press. All were particularly indignant at the insult to President Young. It was very notable from letters received by several members present from manufacturers and dealers of New York City, that only a small few of the many respectable dealers knew but little of the doings concocted by their trusted brothers, nor are they much given to ape the funny man of the press.

English Patents.

521. IMPROVEMENTS IN WATER-CLOSETS, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

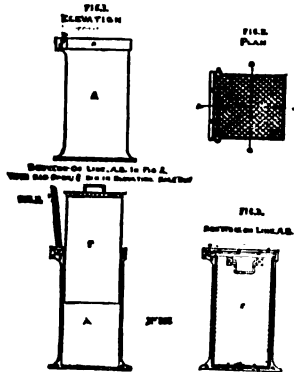


I construct the water-closet contiguous to the external wall of the house, of glazed earthenware, with flushing arrangements by water as usual, and with a valve operated by a handle by the side of the pan, the movement of which turns on a supply of water. The water so admitted moves a flap-valve outside the house after-ward described. The pan is fixed in position, and the pipe leading from it to the waste being preferably made in one piece with the pan, is inclined upward so that it forms a trap between the pan and the outer end of the pipe, sealed by contained water.

WILLIAM HENRY RENWICK, of No. 5 Quayside, in the city and county of Newcastle-upon-Tyne.

Complete specification January 3, 1884. (Price 4d.)

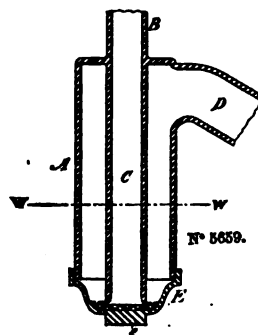
8,480. A NEW APPARATUS FOR THE RECEPTION AND REMOVAL OF HOUSE AND STREET REFUSE. The result partly of a communication made by George Alfred Sidgwick, a person resident at Colorado, U. S. A., and partly of invention and discovery by him.



It consists of two boxes one within the other, the outer box having a hinged lid attached thereto. The inner box is contained entirely within the outer box and can readily be removed therefrom and replaced.

WILLIAM KEEN SIDGWICK, of the Crescent, Surbiton, Surrey. Prov. spec. July 14, 1883. Letters patented January 12, 1884. (Price 6d.)

8,689. IMPROVEMENTS IN SEAL-TRAPS FOR WASH-BASINS, WATER-CLOSETS, AND LIKE PURPOSES. A communication from Abraham Edwards, a person resident at Asbury Park, in the county of Monmouth, State of New Jersey, one of the United States of America.



This invention relates to improvements in that class of traps which are adapted for wash-basins, water-closets, baths, urinals, and like purposes, and where a mercury seal is used to prevent the passage of sewer and other noxious gases or odors through said traps by back pressure, and where such mercury seal is displaced to allow the necessary ejection by hydrostatic pressure.

WILLIAM PHILLIPS THOMPSON, of Liverpool. Prov. spec. December 6, 1883. Letters patented June 3, 1884. (Price 6d.)

8,849. AN IMPROVED METHOD OF AND APPARATUS FOR CONTROLLING THE SUPPLY OF GAS TO RAILWAY-CARRIAGE AND OTHER LAMPS OR BURNERS. A communication from abroad by Michel Ludovic Gaillard, of Paris, France, engineer.

This invention relates to a method of controlling the supply of gas to railway-carriage and other lamps or burners by means of screens or shades employed with the said lamps or burners.

WILLIAM ROBERT LAKE, Southampton Buildings, London. Prov. spec. October 11, 1883. (Price 2d.)

8,889. IMPROVEMENTS IN APPARATUS FOR CARBURETING GAS AND AIR TO BE USED FOR LIGHTING AND HEATING PURPOSES.

This invention has for its object an improved method of carbureting a mixture of gas and air to be used for

lighting or heating purposes, whereby an increased illuminating or heating effect is obtained.

JOHN THOMAS, of 567 Caledonian Road, in the county of Middlesex, lamp manufacturer. Prov. spec. July 6, 1883.

8,886. A NEW PROCESS FOR THE ELIMINATION OF NITROGENOUS MATTERS FROM FERMENTABLE OR FERMENTED SUBSTANCES.

EDWARD RALPH MORITZ, Doctor of Philosophy, of 72 Chancery Lane, London, and Herbert Cabry Lee, of 9 Park Crescent, Portland Place, London, in the county of Middlesex. Prov. spec. July 18, 1883. (Price 2d.)

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; b s dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

520-522 E 18th st, 12 and part 3-story br stable and dwell; cost, done by day's work; o, John Kehoe; a, F. W. Klempt.

16th st, s s, 282.8 e 8th av, 2 5-story br tens; cost ea, \$17,000; o, Annie Fetterich; a, Cleverdon & Putzel.

77th st, n s, 30 w Lexington av, 5-story br flat; cost, \$20,000; o, Patrick H. McManus; a, John Brandt.

67th st, n s, 190 w 3d av, 6-story br and iron bldg (hook and ladder company's house, school and telegraph headquarters for fire department); cost, \$50,000; o, City of New York, for fire department; a, N. Le Brun & Son.

62d st, s s, 182 e Madison av, 2-story br stable; cost, \$10,750; o, Phineas C. Kingsland; a and b, Chas. Buck & Co.

144th st, s s, 270 e 1st av, 2 4-story br tens; cost ea, \$12,000; o, Peter McCormick; a, J. H. Valentine.

106th st, n s, 325 w 9th av, 3-story and attic br bldg (asylum); cost, \$75,000; o, Little Sisters of the Poor, Sister Blanche de St. Marie; a, D. & J. Jardine; b, J. W. Hogencamp & Son and John Geagan.

100th st, 100 w 8th av, 3-story br stable and wagon house; cost, \$15,000; o, Margaretta Eggers; a, J. Kastner.

127th st, s s, 125 e 7th av, 3-story br stable; cost, \$30,000; o, a and b, Wm. J. Merritt.

127th st, s s, 185 e 7th av, 4-story br dwell; cost, \$15,000; o, a and b, same as last.

BROOKLYN.

308-314 Stockton st, s s, 228.6 e Sumner av, 4 3-story fr tens, 25x50; cost, each, \$4,200; o, b and a, George Straub.

Henry st, n w cor Harrison st, 5 4-story tens (cor bldg store and ten), 20x60; cost, each, \$12,000; o and b, Cornelius Donnellon; a, George P. Chappell.

Leonard st, w s, 150 n Calver st, 2 3-story fr tens, 18.9 x58; cost, \$10,000; o, Julia Duryea; a, F. Weber; b, Post & Walker.

Harrison st, n s, 70 w Henry st, 4-story br ten, 30x53; extension 20.9x11; cost, \$12,000; o and b, Cornelius Donnellon; a, G. P. Chappell.

Stockton st, n s, 100 w Lewis av, 8 3-story fr tens, 25 x50; cost, each, \$4,500; o, T. J. Moore; a and b, John Erickson.

N 8th st, s s, 315 w 1st st, 2-story br storage bldg, 100.6x100; cost, \$12,000; o, Dick & Meyer; b, James Rodwell.

9th st, s w cor 4th av, 5 3-story br flats, 21x45 and 59; cost for all, \$35,000; o and b, Assip & Buckley; a, M. Goats.

ALTERATIONS, NEW YORK.

67 St. Marks pl, raise attic to full story, new flat roof, also a 4-story br exten, 25x33; cost, \$8,000; o, Moses Zimmerman; b, Julius Boekel.

BOSTON, MASS.—817-821 Saratoga st, 3 fr dwells; o and b, Thomas Pander.

112 Heath st, fr dwell; o, C. Bleider; b, R. D. Wood.

Roy, cor Wise st, fr dwell; o, N. G. Bartusch; b, R. D. Wood.

144 Everett st, fr dwell; o and b, J. McCormick.

Maxwell, nr Capen st, fr dwell; o and b, M. H. Jackson.

Elm st, lot 18, fr dwell; o and b, C. S. Wood.

Atherton av, nr Washington st, fr dwell; o, M. Pentaur.

Union av, fr dwell; o, James Dowling; b, Joseph Hammond.

60-64 Everett st, 3 fr dwells; o and b, George A. Hargrave.

82 Medford st, fr dwell; o, Mrs. H. Moore; b, J. McCusker.

19 Woodbridge sq, fr dwell; o, C. E. Wiggins, Jr.

17 Mayfair st, fr dwell; o, A. Frink; b, C. H. Blodgett.

108-110 George st, 2 fr dwells; o and b, F. G. Pootunato.

Blue Hill av, br fam hotel; o, A. T. Brown.

324 Warren st, 2 br dwells; o and b, William Donaldson.

143 Kneeland st, br store; o, B. S. Evans; b, Patrick & Nealey.

BOSTON, MASS.—Unnamed pl, side School st, 2 fr dwells; o, M. Murphy; b, J. W. Berry.

Crescent av, nr Newport st, fr dwell; o, S. P. Holbrook; b, E. Downing.

Poplar st, w Hilborn st, fr dwell; o and b, A. Rogers.

Burnstead Lane, w s, 4 fr dwells; o, P. H. McCormick; b, McDonald & Tobin.

75 Munroe st, fr dwell; o, J. W. Dadman; b, T. Cluse.

Porter st, nr Boylston av, fr dwell; o, C. Payden; b, R. Tiller.

Ashford st, w s, Linden st, 3 fr dwells; b, Larkin & Dunton.

Dickens st, w s, Clayton st, 3 dwells; o, W. C. B. Fifeild; b, James Iacon.

43 W 6th st, fr dwell; o, T. Muncy; b, M. S. & G. Miller.

Whitney st, nr Tremont, 2 dwells; o, Ellen F. Mahoney; b, W. Ballantyne.

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DISINFECTANTS AND DISINFECTION.

As might naturally be anticipated, the French journals of the day contain many articles with reference to the cholera and the precautions which should be taken against its spread, etc. A recent number of *Le Génie Civil* contains an interesting popular article by M. Marie-Davy, Director of the Observatory of Montsouris, at Paris, on "The Cholera Epidemic." Admitting the intervention of the microbe discovered by Dr. Koch in the spread of the disease, the writer discusses the means for the destruction of the organism and its germs. Judging from experiments which have been made on other similar organisms, it is held that for articles of food and drink exposure to the temperature of boiling water is sufficient. For dry objects, such as articles of clothing, a somewhat higher temperature is desirable, perhaps as high as 110° or 120° centigrade; but the lowest effective limit has not yet been ascertained. Passing from the employment of high temperatures to the use of disinfectants, commonly so-called, M. Marie-Davy alludes to the experiments which have been carried out during the last few years by M. Miquel, at the Observatory of Montsouris. These experiments were carried out on other microbes than those which are supposed to be the cause of cholera, but the general results may no doubt safely be applied in this special case.

While it is true of a limited number of disinfectants that they are able actually to kill the germs of the microbes, it is true of by far the greater number that they simply retard the development of the germs while they are actually in contact with them. If the disinfectants be removed, the germ which has remained dormant will begin to develop. M. Miquel divides the ordinary disinfectants into six classes, according to their efficiency in preventing or in retarding the development of germs. (This classification he has followed in his work, "Les Organismes Vivants de l'Atmosphère.")

The first class includes those substances which are in the highest degree antiseptic—such as the salts of mercury and silver and peroxide of hydrogen (oxygenated water). Of all, the binoxide of mercury is the most efficient. Meat-broth containing twenty-five milligrammes of this salt in the litre does not putrefy. Of the bichloride of mercury (corrosive sublimate) to produce the same effect, seventy milligrammes are required, and of the peroxide of hydrogen fifty milligrammes. The highly poisonous character of the salts of mercury makes it necessary to employ them only with proper precautions. In the second class M. Miquel puts chlorine, bromine, and iodine. In the state of vapor these substances act very slowly. Five grammes of chlorine or of bromine in a cubic metre of air destroyed the spores of bacteria after an exposure of forty-eight hours. Iodine-vapor is much less active, but in solution a quarter of a gramme of iodine to the litre will prevent the putrefaction of meat-broth. Among the substances in the third class we find salicylic-acid, the use of which in articles of food has been condemned by the *Conseil Supérieur d'Hygiène*. M. Marie-Davy believes in the justice of this decision. The acid, however, will prevent fermentation if present to the extent of one gramme per litre. Carbolic-acid, although one of the most commonly employed disinfectants, is only one-third as effi-

cient. In the same class we find chromate of potash, chloride of zinc, nitrate of lead, and many other familiar substances. Boracic-acid, salicylate of soda, and persulphate of iron fall into Miquel's fourth class, while borax and chloride of barium appear with other substances in class five.

In questions of disinfection we are concerned not with foul odors, but with living things. The odors may be disagreeable, and, on this account, not without their effect on the system; but they are seldom the cause of poisonous effects. If we mask the odors we do not remove the source of danger. Our aim, therefore, should be to remove the putrescible matters themselves, or—until that can be accomplished—to prevent them from entering into putrefaction; that is, to prevent the development of the microbes. This can be accomplished by the judicious use of disinfectants.

POLLUTION OF PHILADELPHIA WATER-SUPPLY.

THE report of Chief Engineer Ludlow, submitting the result of examinations of the pollution of the Fairmount pool, whence the water-supply of Philadelphia is drawn, exhibits a most revolting and loathsome state of affairs; and the difficulty is that there does not seem to be any summary way of dealing with the matter. The regular processes of law are slow, and in addition there are to be encountered, on the one hand, the inertia of the wealthy manufacturers, who have not been deterred by any qualms of conscience from deliberately making a cesspool of the pond whence nearly a million people draw their water, and on the other hand, the blind dumbness of elected officials, who would rather poison their many ignorant constituents than offend a few wealthy ones.

The plain duty of the city officers is to compel immediate and absolute cessation of the polluting practices. It would doubtless cause the city some expense for damages, but the pecuniary injury would be as nothing when compared with the damage to health likely to occur from a continuance of the outrage. In such a cause forcible suppression of the offending practices is justifiable, for moderation toward the offenders means procrastination. Better to act promptly and let the lawyers fight it out afterward.

A WORD OF CAUTION.

THE residents of cities and towns are returning to their homes after their summer vacations, and in a great many places which have not all the modern improvements, and in some which have, they find that there is a great deal more dirt and discomfort at home than they thought there was, and they are, therefore, ready to enter into preparations for securing water-supply and sewerage. Of course, they want to accomplish the most that is possible with a limited amount of money, and it is not uncommon for them to undertake to evolve projects out of their own brains, under the impression that they know their own town better than any stranger can. That is where they are mistaken. They had better spend a reasonable sum of money in procuring the opinion of an expert than spend their time in discussing matters of which they are ignorant. And when it comes to selecting an expert, they want to be very sure that he

knows what he is about. There are a good many civil engineers who are excellently fitted for their own line of work, but know little about sanitary work, and there are a great many so-called sanitary engineers who are ignorant of the principles both of hydraulics and of construction. And it may be set down as an axiom, that a man who places his own services at a low price is worth no more than his own valuation of himself. In the long run he will be found to be more expensive than one whose experience qualifies him to express an opinion.

THERE seems to be trouble in Rochester, N. Y., about garbage. Complaints are made that some of the city officials have an interest in the contracts for collecting it, and are greatly incensed if any citizens are so obstinate as to require the terms of the contract to be complied with, and the contractor put to the expense of sending teams around frequently. The appropriation for the garbage-service for the quarter ending July 31, 1884, was \$3,205.50, and yet in many parts of the city great inconvenience was experienced from neglect of the collectors. It is a pity that so handsome and charming a city should suffer in this way.

THE town of Framingham, Mass., is beginning to waken to the pressing importance of water and sewerage questions. A correspondent of the Boston *Herald* writes: "Something must be done looking to the introduction of pure water, or every dollar we have invested in business and real-estate will surely and steadily depreciate in value. One-half of all our people are now drinking from contaminated wells, and the germs of fever and kindred diseases lurk within them." It is a hopeful sign to find citizens appreciating thus the commercial as well as the health value of a modern sanitary system in these matters.

IN another column will be found the order just issued by Commissioner Raymond of the Brooklyn Health Department, prohibiting the use of tin-washed copper or lead fountains, vessels, pipes, faucets, etc., for the storage or draughting of soda-water, mineral-waters, syrups, etc. Dr. Raymond states as the ground of his action that the recent hearings on the subject afforded evidence enough to convince him that the probability of contamination by this kind of contact was very great, and that this opinion is confirmed by an examination just made by the chemist of the department, Dr. Bartley, who visited fifty-five places where soda was found in various parts of the city, including some of the principal thoroughfares, and found on analysis, copper in the syrup in eight instances, and in the soda or mineral-water in seventeen instances. Only four tin-washed copper fountains were discovered in use, and in every one of these the soda contained copper. Though it may be said that the poisonous matter in these cases is too small to be likely to produce serious injury, yet the facts certainly bear out Dr. Raymond in the course he has taken.

It seems that our investigations into the condition of some of the worst of New York tenement-houses have already been productive of good. The police took notice of the inquiries and examinations of our representatives, and a few days after "raids" were made upon some of these places. From 35 and 56 Mulberry Street over forty tramps, nearly all women, were taken out of the stale-beer dives, and the next day sent to the work-house. We are glad that even this much has been accomplished. We continue our description in this issue.

RECENT developments have suggested the propriety of explaining some features of the recent so-called plumbers' trade-protection movement. Those of our readers who care to follow the matter will find some suggestive reading on another page, and some of our plumbing friends may conclude that they have entirely misapprehended the situation.

NEWARK SEWERAGE.

THE sewage from the south-western part of the city of Newark, N. J., traverses a long section of salt marsh on its way to Newark Bay, and is held in tidal channels and overflows the meadows, creating a nuisance. The City Engineer, Mr. Schaeffer, and Mr. Alphonse Fteley, called in as consulting engineer, advised that no temporary relief was practicable, and recommended that pumps be used to lift the sewage and let it flow through a wooden conduit to the bay.

Mr. James F. Bless proposed a plan to dam the sewage and make a pool from which bailing-wheels would lift the sewage and let it flow over the dam during the last hour of ebb tide, flushing it down the channel of a ditch by water from a tidal reservoir. Messrs. J. W. Adams and Rudolph Hering, being called on to report on these two schemes, condemned Bless' and indorsed Fteley's, and the Common Council have ordered work begun on the latter.

THE water supplied to Orange, N. J., has been of unpleasant taste and odor for a few weeks past, although the water in the storage-reservoir was apparently pure. The trouble was that there was not enough circulation in the pipes. There are thirty-three miles of mains and only about 300 consumers, and the water stagnated in the pipes. A thorough flushing renewed the water in the pipes and the offense ceased. At the outlet of the reservoir the water is now passed through layers of sponge and charcoal, an arrangement which acts well as a strainer of coarse matters, and has the advantage of quieting the apprehensions of a great many people, who feel better when they know that their water is subjected to some kind of "process."

THE *Detroit Free Press* relates that "after half a dozen persons had died in a fine-looking dwelling-house in Washington, an investigation was demanded, and it was found that the plumbing had been done without a single trap. The owner saved about \$12 by leaving them out."

Our regular Washington correspondent, to whom the above story was submitted, writes that no such case as reported by the *Detroit Free Press* has come to the knowledge of the authorities there, yet investigations made by the Health Department reveal the fact that there are many houses without a single trap. Such defects are promptly remedied under Section 10 of the laws and ordinances relating to the public health of the District of Columbia. This ordinance calls for a trap on connections between any sewer and any ground or building, but does not give the authority so necessary, and so often asked for by the Inspector of Plumbing, under the Health Department, to investigate the condition of the drainage and plumbing in all old houses. It is confidently expected that this additional legislation will be obtained from Congress at its next session.

COPPER AND CHOLERA.

BEARING on the question as to whether copper and copper-salts secure immunity from cholera, the following, gleaned from the *Revue d'Hygiene*, is of interest:

Dr. Chaumery, a physician at Alexandria, instituted inquiries at Cairo, with the view of ascertaining whether persons engaged in the making of copperware were ever attacked by cholera, or, as claimed by some, were exempt from this disease. Careful investigation showed that of 300 or 400 workmen so engaged about thirty had had the disease, and that thirteen or fourteen had died. In these instances, then, copper had exerted no preventative influence.

FIGURES ON PAPER MANUFACTURE.

THE French journal *La Papeterie* publishes from official inquiries into the matter the following facts regarding the manufacture of paper:

The number of paper factories on the globe is 3,985. These produce 952,000,000 kilogrammes of paper, of which 476,000,000 are used for printing. Newspapers alone use annually 300,000,000 kilogrammes, which would be about 822,000 kilogrammes per day. For government purposes 100,000,000 kilogrammes per year are used. Schools consume 90,000,000, commerce 120,000,000, the industries 90,000,000, and private correspondence 52,000,000.

The United States produce and consume the greatest quantity of paper. There are here in all 900 factories, the first having been established in 1693. Next comes England, with 800 factories. It has been estimated that per annum an Englishman uses $11\frac{1}{2}$ pounds, an American $10\frac{1}{4}$, a German 8, a Frenchman $7\frac{1}{2}$, an Austrian $3\frac{1}{2}$, a Spaniard $1\frac{1}{2}$, a Russian 1, and an Italian 1 pound of paper.

OUR BRITISH CORRESPONDENCE.

Telephone Experiments in Belgium—The Local Government Board and the Cambridge Improvement Commissioners—A so-called Electric Girl in Paris—New Main-Drainage Works at Colchester.

LONDON, September 13, 1884.

M. VAN RYSELBERGHE has recently made very successful experiments with his system of telephoning to long distances through the ordinary telegraph wires. Last week six microphones were fixed to the two small columns of the Kiosk of the Vauxhall (Brussels), so as to be on a level with the musical instruments. The carbon transmitters were connected to the central office of the Compagnie des Telephones, thence the circuit was prolonged by a double wire to avoid telephonic induction as far as the central telegraph station (Brussels Nord), which was put into communication with the directors' office, where ten Bell receivers had been intercalated in the circuit to allow of the music of the concert being heard in Brussels, while being transmitted to the Antwerp Railway Station, a distance of twenty-eight miles. The music was heard distinctly at both of these places, and at the time the music in Brussels was telephoned to Antwerp by means of the telegraph wires these were not taken off their ordinary work, but continued to transmit messages in all directions. It is in this that the novelty lies, no conducting-wire whatever being placed; all is passed through the ordinary telegraph wires. It is said the two services are completely distinct from one another; the telegraphist does not perceive the working of the telephone, and the telephonist is quite unaware of the working of the telegraph. Great satisfaction is expressed in Belgium at the successful working of M. Van Rysselberghe's system.

The Local Government Board has caused a letter to be addressed to the Cambridge Improvement Commissioners relative to the sewage question, in which it states that "the board cannot but regard it as unsatisfactory that notwithstanding the question as to the 'provision of a scheme of sewage and sewage-disposal for Cambridge has been so long before the Cambridge Improvement Commissioners, no progress has been made in the matter,' and the board proceeds to state that unless the Commissioners take immediate steps to remedy matters, the board will feel it necessary to act upon the complaint of default which has been made to it and issue an order under the Public Health Act, 1875, limiting a time for the performance by the Commissioners of their duty in this matter." The Local Government Board has also taken steps to prevent the pollution of the waters of the River Lee, by the discharge of sewage matter into them, and has called upon the neighboring local authorities to provide further and more efficient means of disposing of their sewage.

M. Meunier, a Parisian, is responsible for the following account of an electric girl: The girl, aged 13, was working in a factory when a small table next to her was violently upset without any apparent cause. Subsequently in the presence of M. Meunier she sat on a chair, held by several people, when the chair was hurled from their hands. When isolation from the ground was produced by glass, none of these effects happened. The girl suffers no pain beyond a slight one in the hollow of her elbow.

The new main-drainage works of Colchester, England, on the river Colne, have cost \$278,750. They were built after plans of Mr. Charles Clegg, C. E. The sewage is conveyed two miles from the town to a farm of twenty-five acres, where two 25-horse-power engines operate two sets of 3-throw ram-pumps, lifting the sewage into two tanks, each 50' x 200', in which the sludge settles and is removed four times a year by farmers who pay for it. It amounts to 20,000 tons a year. The effluent flows over a weir into carriers which encircle the farm, which is closely sub-drained, carrying the water eventually into the tidal river, seven miles from the sea. SAFETY-VALVE.

THE millers of Rochester, N. Y., are considering the advisability of lowering the outlet of Hemlock Lake, so as to be able to draw more water from it for the motive power of the mills during the dry season. Mr. J. Nelson Tubbs, the City Engineer, considers that the lake can be advantageously used as a storage-reservoir, the annual rainfall on its water-shed being sufficient to replenish it after being drawn down during the dry season, and thus make the average yield of the lake uniform, instead of an alternation of freshets and deficient supply.

PEST-HOLES IN NEW YORK.

No. II.

THE accompanying sketch and diagrams illustrate a condition of affairs to be found at the junction of Bayard and Division Streets with Forsyth Street in this city.

Figure 1 is a ground-plan of the tenement-houses Nos. 3, 5, and 7 Bayard Street, and 62 to 68 Division Street. Fig. 2 is a view in the yard for the use of these houses, and Fig. 3 is a detail of the privy construction.

These tenements are greatly crowded, receiving little or no light except from the streets, and being inhabited by fifty families, mostly Russian-Polish Jews, many of which are tailors and tailresses, who work in their crowded

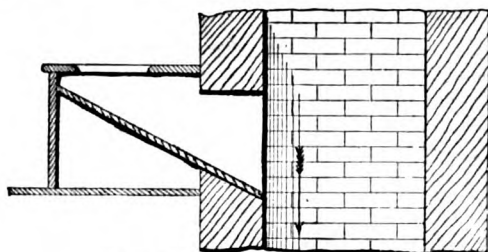


FIGURE 3.—DETAIL OF PRIVIES.

rooms in the day-time, with their families about them, and of course occupy them as dormitories at night. It is with the court-yard and privies we have to deal, and show to the public at large what is tolerated in a civilized community which boasts of the most perfectly organized health department in the world, and this, although there have been complaints and inspections made year after year of the dangerous nature of these premises. Some of these buildings open at the rear into this yard, which is triangular in shape, 10 feet wide at the base and 24 feet from the base-line to the angle at the apex; in other words, having an area of 120 square feet, or less than half a square foot to each human being on the premises. Around this yard run wooden galleries six stories high, which are to serve the double purpose of fire-escape and means of access to the privies, which are against the positions marked A A on the plan. These privies are wooden structures built against the brick-shafts A A. A sloping-board underneath the privy-seat receives the human discharges. Figure 3 is a section through these seats and the shafts. The angle of this board with the horizontal is 34° to 35° by actual measurements, while the angle of repose of fecal matter which lodges on it can better be imagined than described. There are 24 such openings as these (shown in Fig. 3), opening into these vertical shafts, and which are

used by about 300 people in the 24 hours. There is no flush of any kind, except a tenant, more cleanly than the rest, happens to throw a bucket of suds into a privy-hole.

Nothing is done to clean the shutes or shafts, nor can they be cleaned, the constantly increasing mass of filth adhering to the shutes and walls until the superabundant weight causes it to move glacier-like to the bottom of the sink-hole. From the sink-holes at the bottom of the shafts the mass of filth moves through brick and stone drains to a cesspool situated under the rotten wooden cover W, Fig. 1, which can also be plainly seen in Fig. 2. From this point the pressure forces it to a point in the cellar at T on the plan, Fig. 1, where there is a hole to "clean it"—i. e., to shove it along with a hoe or board, as is done at the cesspool in the yard. When water will run at the hydrant in the yard it is mostly kept wasting into the sewer for the purpose of flushing the drain; but as it does not flush the bottoms of the privy-stacks its use or its waste becomes of doubtful benefit.

The whole ground of the yard underneath the broken flags and stones is saturated with filth, and the soakage through the walls of the shafts cannot be disguised. The privy stench is simply unbearable to any but those who have lived in it so long that their sense of smelling is impaired, at least to this particular odor. It fills the yard and lower stories and the galleries and the rooms that open on the yard. To the right in Fig. 2 an insight is given to one of the closets in the yard similar to the ones which odorize each of the galleries. The notice on the urinal-wall tells its own tale of the use of the yard and requires no comment from us. The soil and waste pipes under the restaurant and kitchen are broken and open, and made of odds and ends, galvanized sheet-iron, cast-iron, and lead all being used; a 3-inch iron pipe and a 2-inch lead pipe being side by side into a 6-inch tee, which is open.

THE LATE ISAAC NEWTON.

ISAAC NEWTON, Chief Engineer of the Department of Public Works, New York, whose death was the result of suicide, committed while insane, was born in New York City, August 4, 1837. He was the eldest son of the late Isaac Newton, who died in 1858, and who was for many years largely interested in steamboat building and navigation on the Hudson River, having constructed about forty vessels, among which may be mentioned the "Balloon," "Hendrick Hudson," "Knickerbocker," "North America," "South America," "Isaac Newton," and "New World," many of which may be remembered by old travelers on the Hudson River. Mr. Newton's literary education was acquired at Hamilton College, N. Y., at the New York University, where he studied engineering, and at the University Medical College. His practical education was acquired by apprenticeship at the Novelty Iron-Works, and with the Delamaters, in New York. He was compelled by his father to work his way from "greaser" to assistant engineer on one of the North River boats. While quite a young man he served as chief engineer on one of the first vessels of the noted Collins' line of steamers sailing from New York to Liverpool.

On the breaking out of the war he applied for a position in the navy, and upon examination was given, in 1861, the grade of First Assistant Engineer, U. S. Navy. He was first assigned to the U. S. Frigate "Roanoke." In the latter part of 1861 he was assigned by the Navy Department to the duty of assisting Captain John Ericsson, at the request of the latter, in the construction of the iron-clad, "Monitor." This vessel was launched January 30, 1862, one hundred days after the keel-plate was laid. In March, 1862, he sailed on the "Monitor" for Hampton Roads as acting chief engineer, and took part in the historical combat with the "Merrimac" March 9, 1862.

An incident characteristic of him occurred while on the trip from New York to Hampton Roads. Some contrivance connected with the ventilation of the boiler-room got out of order and allowed the gas from the furnaces to escape, nearly causing the death of the stokers. Newton, at the risk of his life, entered the room, dragged out the men, and took the place of stoker himself till the trouble was remedied. He was taken from the room in an insensible condition.

Soon after the battle he was assigned to duty as supervising constructor at New York, and superintended the building of many of the iron-clads, among which may be mentioned the "Puritan" and "Dictator." In 1869 he was a member of the board to investigate the condition of the navy, but differences with the Chief of the Engineering Bureau induced him to resign. In 1871 and 1872 he

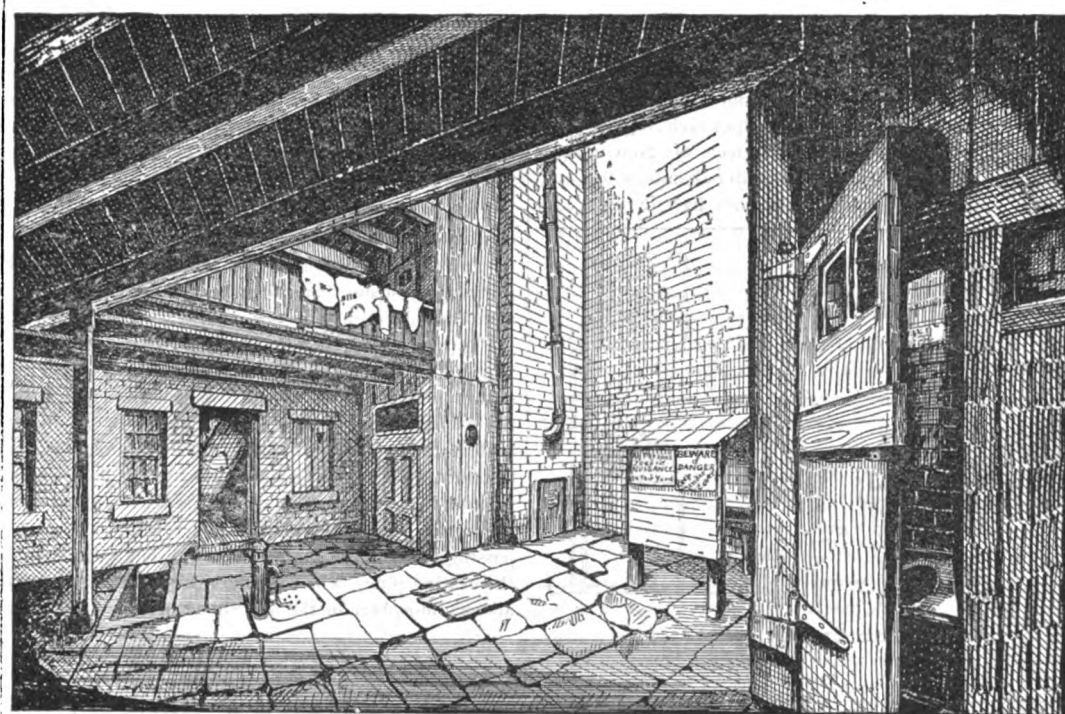


FIGURE 2.—VIEW IN YARD.

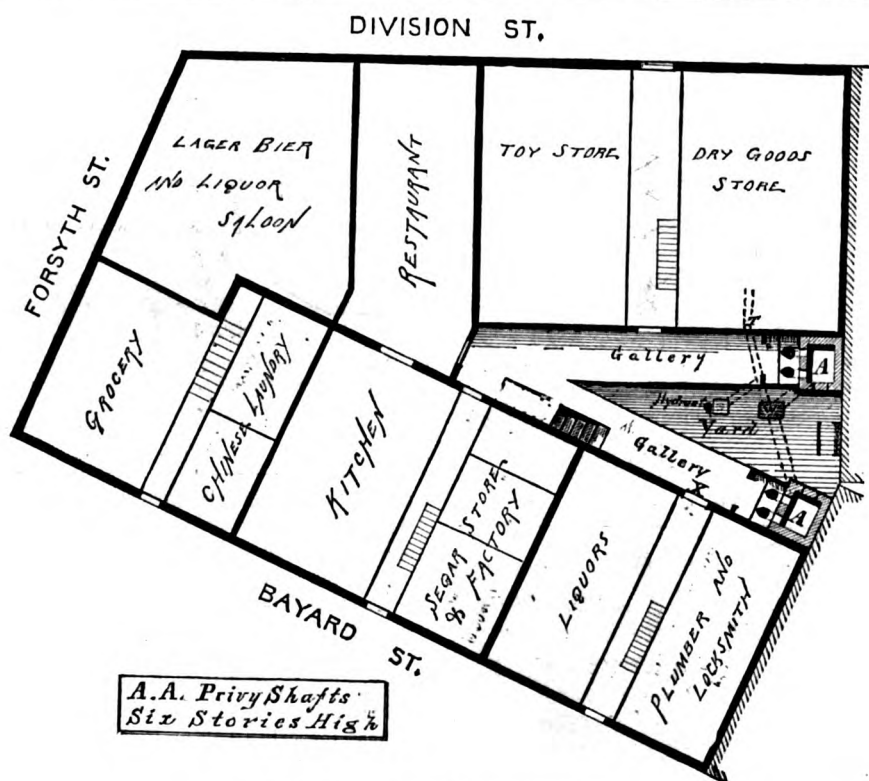


FIGURE 1.—PLAN OF HOUSES.

was appointed by General G. B. McClellan, then Chief Engineer of Department of Docks, his assistant, and under his direction Pier No. 1 was built, and designs made for the permanent improvement of the river-front by building stone bulk-heads and improved docks. In connection with this work of improvement, the laying of immense blocks of *beton* for foundations made necessary the construction of a derrick capable of lifting large weights, and Newton planned and superintended the construction of the now noted 100-ton derrick. (See description in Knight's Mechanical Dictionary.) Upon the resignation of General McClellan from the department, Mr. Newton accompanied him and assisted him in rebuilding the Stevens Battery.

Among other engineering works planned by Mr. Newton may be mentioned the plant of the Kemble Coal and Iron Company at Riddlesburg, Pa., and the drainage-works in connection with the International Railway in Nova Scotia. This last work drained Lake Margave and required the control of 50,000,000 gallons of water each day.

Mr. Newton was one of the Rapid Transit Commissioners appointed to arrange plans for the rapid transportation of passengers and freight in New York City.

He was appointed by Mayor Cooper one of the trustees of the Brooklyn Bridge, but resigned soon after. In 1881 he was appointed Chief Engineer of the Department of Public Works. In this position he became identified with the great work of his life, and the greatest scheme for a water-supply of modern times—namely, the new aqueduct and Quaker Dam scheme. His reports and labors in connection with the inception of that work are familiar to our readers. Mr. Newton was a member of the American Society of Civil Engineers, the American Society of Mechanical Engineers, and of other scientific bodies. At the regular meeting of the Aqueduct Commissioners, held upon the day of his death, resolutions were directed to be drawn up expressing the esteem in which the deceased was held by the board as an official and personally.

Mr. Newton's suicide was caused by temporary insanity, induced by ill health, melancholia, and financial losses. While engaged on the Croton surveys two years ago, Mr. Newton contracted a typhoid fever, from the effects of which he never fully recovered. He had been urged to take a vacation this summer, but seemed to feel a morbid obligation to continue at his work until the aqueduct was completed.

The death of his brother, Prof. Henry Newton, the geologist, who died while on an exploring expedition in the Black Hills in 1878, had also a serious effect on Mr. Newton's health and spirits. In 1883 he had also an attack of pleuro-pneumonia. His financial troubles were due to false representations on the part of a friend who induced him to indorse notes. He died a poor man.

His professional record must be a source of pride to his friends, and his melancholy death has drawn out their sincere sympathy and sorrow.

THE LATE GEORGE P. RANDALL.

ARCHITECT GEORGE P. RANDALL, for thirty years prominent in his profession in Chicago, died on September 20, at his native village in Vermont. Four days later he was buried at Chicago, the funeral services taking place in the Union Park Congregational Church, of which edifice, one of the finest in the city, Mr. Randall was himself the architect. Mr. Randall was personally popular and was esteemed by all who knew him for his qualities as a man, as well as for his professional attainments. Throughout the entire north-west there was no architect who had built so many school-houses and churches as he. At the time of his death Mr. Randall was sixty-four years of age.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XIX.

(Continued from page 388.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

EAST QUADRANT—CLASS M.

JAMES KEITH, Arbroath, Edinburgh, and London (stand No. 629), exhibits some special apparatus for warming by hot water, upon the low-pressure system. A boiler is shown built up of a series of sections in cast-iron. The fire-box is corrugated vertically, and has a shaking grate.

Each section above is made with horizontal water-tubes, the tubes and spaces coming alternately. In the language of the shop, they are "staggered." The whole is bolted together by four bolts passing up through the corners, which form water-circulating columns. The joints are faced, and made with I R rings, and being water-jacketed no fire comes in contact with them.

A new form of upright coil is exhibited, made up in va-

the coil is made by bolts passing through horizontally. An ornamental entablature completes the design, no coil-case being required.

At the same stand is a model of a mineral-oil gas-works, which consists of a bench of four retorts (Fig. 1). At one end of each retort there is a tube for the admission of the oil, while at the other end is the outlet-pipe. The gas passes through a condenser and a scrubber to the holder. There

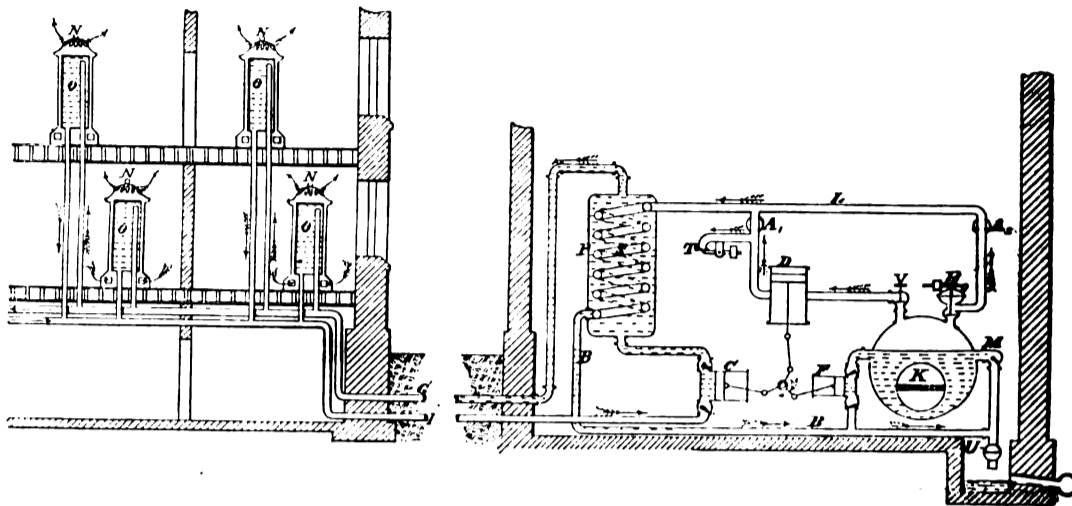


FIGURE 3.

rious ways. The principal arrangement is composed of any given number of loops of four pipes each, representing equivalent surface to twenty-four feet of 2-inch pipe. Those are cast in one piece, with water-chambers top and bottom. Joints are formed on the sides by I R rings, and

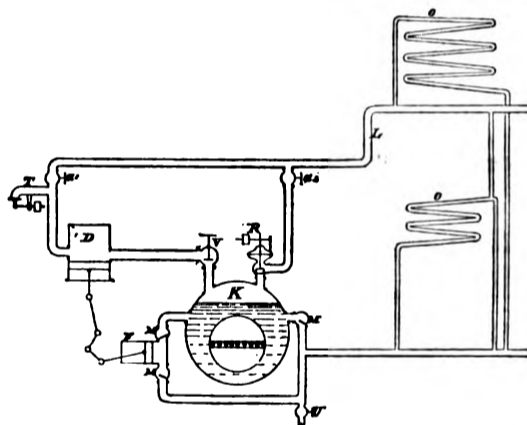


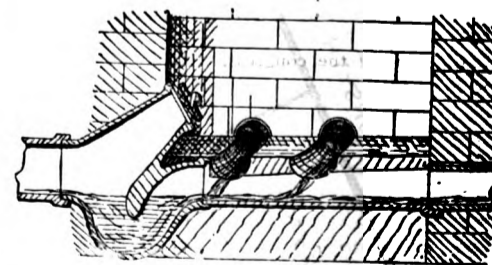
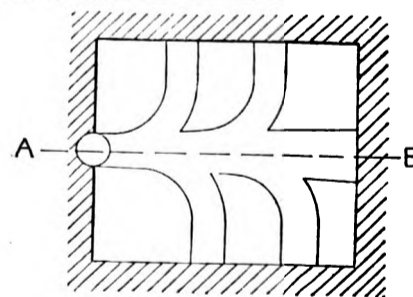
FIG. 2.

is also a "meter-mixer" connected with the apparatus for automatically supplying a given proportion of air before the gas passes into the pipes for consumption.

EAST CENTRAL GALLERY.

A. B. Reck, Copenhagen, Denmark (stand No. 1,279) exhibits some hot-air stoves and furnaces that do not call for any particular attention. Two plans are displayed for warming by steam that present such features as to induce us to reproduce them.

Figure 2 represents a design stated to be in use at the Royal Fine Art Exhibition Building, Copenhagen. It is so arranged as to work with live steam from the boiler or the exhaust from electric-light engines, or a mixture of both, as the patentee mentions. In the figure, F is a pump to return the water of condensation to the boiler. D represents the engine, some of the power of which operates the pump. Steam leaves the boiler through the valve V, passing through the engine, thence through the valve *a* to the heating pipes, which of course have a pressure but little above atmosphere in them. Should the quantity of steam



FIGS. 5 AND 6.

passed by the engine be greater than the requirements of the heating apparatus, the back-pressure valve T opens, allowing the excess to escape to atmosphere. But on the other hand, should the engine be performing small duty, and passing little exhaust steam, the regulating-valve R on the boiler opens automatically and passes the extra quantity of steam necessary to maintain the desired fullness in the heating pipes, through the stop-valve *a*².

Fig. 3 shows an apparatus the principal claim for which is that the exhaust steam from engines run at night for lighting purposes can be used to heat water and be made to retain the heat in a non-conducting coil-case for use ext

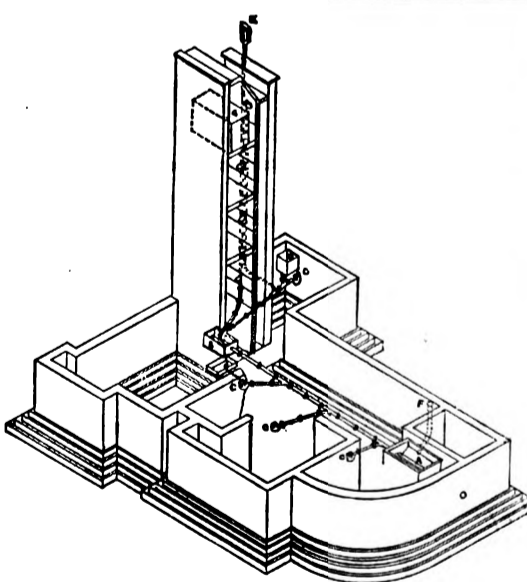


FIG. 4.

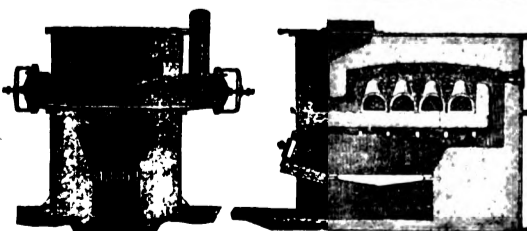


FIG. 1.

day without running the engine, and also that the water can be circulated by a pump throughout the system, while exhaust steam cannot be carried to such distances. In many respects our remarks on plan No. 1 will apply here, the same letters applying to similar parts. It will be observed that the pipe I conveys the steam—live or exhaust—to the coil S within a water-tank (P), the condensation being returned by the pump F. The other pump, C, circulates the water from the tank P to the smaller reservoirs O throughout the house, storing hot water in the same and bringing all the water to as high a temperature as possible during the night, or at such times as the engine is running. When the cases which inclose the heat-reservoirs O O are closed at their tops, no passage of air occurs, hence only a comparatively small loss of heat; but where heat is required the registers are opened, and the warm air circulated freely. Other points will suggest themselves to the reader by a study of the diagram. Of results obtained by this method we know nothing.

W. Phillips & Son, 10 Baker Street, Portman Square, London, W., on stand 374 exhibit a wooden model for an improved air-tight flap for manholes; their "Simplex" grease-trap, with retainer for sand or other solid matters, this trap having a screwed removable cover on the outlet for access for the removal of any obstruction in the drain; a miniature model shower and spray bath, with the necessary supply and waste-pipes, and which has the water laid on to show its working. They also exhibit two large wooden models to illustrate their system of house sanitation. One represents a house where it is convenient to lay all drains clear of the house walls. To show the working, the drains are made of short pieces of glass tubes, with socketed joints; at the extremities, or where it is necessary they should bend, an inspection-chamber, with channel-pipes in the bottom, is made. A portion of the elevation is shown in section, with water-closet, baths, and sinks in miniature. These have the water laid on them, so as to render them complete as working models. Fig. 4 is an isometrical drawing to a scale of half an inch to the foot of another model, showing a house where the drains are laid under the basement floor. A is the disconnecting-chamber and trap fixed just inside the front wall of the house; B is another chamber at the other end of the main drain; C C C C are intercepting gulley-traps; D is an automatic flushing-tank for periodically flushing the drains. The rain-water pipe, shown by dotted lines, discharges into a similar gulley-trap (not shown on the drawing); D is a ventilating-cowl on the top of the soil-pipe, shown by dotted lines, and which also acts as the drain ventilation; F is a provision for fresh-air to enter the drains at the front manhole; C is the reservoir-cistern. Fig. 5 represents a manhole or inspection-chamber, showing four side drain branches, which is doing duty for one or two other exhibitors by the side of Messrs. Phillips' stand. Fig. 6 is a longitudinal section of the same showing the trap, etc.

(TO BE CONTINUED.)

THE FIFTH INTERNATIONAL CONGRESS OF HYGIENE.

No. II.

(Continued from page 389.)

THE delegates numbered among them men of the highest ability and standing. Their names must have influenced many persons, thus lending the lustre of their reputation to the work of the congress. Taken alphabetically the principal delegates were, after those of the United States already mentioned: From the Argentine Republic, Dr. Guillermo Rawson, professor at Buenos Ayres; Austria, Prof. and Dr. J. Soyka, of Prague; Bavaria, Dr. Rudolf Emmerich, who exhibited a number of false membranes from diphtheritic patients, and sought to prove an intimate connection between the disease prevalent among pigeons and that which is so often fatal with human beings. The distinguished professor who invariably raises the question of water-supply, Dr. Croeg, represented Belgium. Dr. Jules Rochard, Chief of the Naval Sanitary Administration, Dr. Brouardel, the eminent chemist, Dr. A. Proust, who had been sent by their Government to Toulon and Marseilles at the outbreak of the cholera epidemic, and Dr. E. Vallin, Professor of Hygiene to the army, were the four representatives of the French Government. Dr. Alphonse Corradi, of Pavia, who discoursed at length on the contagious nature of consumption, represented Italy. Dr. Zoëros Bey was sent by the Sultan all the way from Constantinople to demonstrate, in the face of Christendom, that Mahomet was a sanitary reformer; a task which he accomplished with much vigor, and which was crowned by

the applause of an enthusiastic audience, delighted to find that henceforth they could quote the Koran in defense of the morning tub and daily gymnastics. The Danubian Principalities were represented in force; Servia, Roumania, and Bulgaria had each their delegates, and even the Japanese Government sent Dr. Masanori Ogato, who took good note of the proceedings, made a speech on vital statistics, and was highly delighted with the evening festivities and his new dress-suit of European clothes which he donned in honor of the congress, to the great disappointment of the members, who would have preferred the native costume. Dr. Zoëros Bey faithfully preserved his Eastern fez, wore a uniform resplendent with gold braiding, and dragged at his side a huge Turkish scimeter, thus gaining the lion's share of public notice.

A formidable volume will be issued in the course of a few months, giving a complete account of the proceedings. This is absolutely necessary, for no newspaper can describe the debates held by five different sections during a whole week. The debate on cholera, which extended over three days in the first section, offered the greatest general interest. It was often repeated that certain nations allowed the public health of Europe to be endangered rather than interfere with their commercial interests; and evidently a certain amount of political animosity existed against England. Dr. Dutrieux Bey, of Alexandria, got badly beaten in trying to prove that there was no such thing as Asiatic cholera, that cholera sprung up spontaneously, and that importation had little or no effect on its development, attacking quarantines and demanding the substitution of rigorous medical and sanitary inspection with disinfection, even when there were merely cases of dysentery and diarrhoea. The majority voted in the proportion of two to one against this proposal, but then there was a large number of abstentions.

In the same section, Dr. Van Tienhoven, of The Hague, described a hut he had built in the hospital garden of the town, where he proposed to nurse the first case of cholera that might occur. He intended locking himself up with the patient, and would break off all connection with the outer world till after cure or death. Just outside the hut he placed a disinfecting apparatus which he had designed. In the centre there was a furnace, and around it a boiler. All the air drawn from the hut was purified by passing through the furnace. All the soiled matter, foul linen, etc., was at once thrown down a pipe from the hut into the fire, and there burnt, while all liquids were boiled to evaporation. All the cups, plates, and utensils used in the hut are of wood, so as to be immediately destroyed by fire when no longer required, and finally the hut itself is to be burned when it has been contaminated.

In the second section there was a very interesting debate on a report presented by M. Bergsma, one of the municipal officers of the town of Amsterdam, on the results obtained from the application of the Liernur system of drainage. In creating new quarters the town of Amsterdam had made essays on a small scale; but now the pneumatic system of drainage was applied to no less than 3,100 houses, inhabited by 52,000 persons. The municipality had voted the construction of works at a distance of five kilometers from the town, where the sewage brought up by pneumatic suction would be converted into manure.

This naturally brought up M. Durand-Claye, who related that the technical commission appointed by the Paris municipality had visited Amsterdam, and found that the principle could not apply to such a town as Paris. M. Durand-Claye then denounced the bad sanitation and light death-rate of Paris, where "health had been sacrificed to beauty." He related how the few real water-closets existing in Paris were thoroughly appreciated, and sketched his plan for the general drainage of Paris according to the English system. To this it was objected that not only was pneumatic drainage applicable to Paris, but it had been applied, and this over a distance of more than five kilometers. The whole of the most wealthy and fashionable part of Paris, comprising the Grand Hotel, the Rue Royale, the Boulevard Malesherbes, the district especially inhabited by the American and English visitors and residents, was now being drained by a method which was an improvement on the Liernur system. The Berlier system of pneumatic drainage had the great advantage that it did not limit the amount of water used in the closets. M. Emile Trélat defended M. Durand-Claye, and M. Duverdie delivered a long speech in the name of those who lived in the neighborhood of sewage-farms, protesting against them as the cause of much inconvenience and a danger to health.

(TO BE CONTINUED.)

POLLUTION OF THE SCHUYLKILL RIVER WITHIN THE LIMITS OF THE CITY OF PHILADELPHIA.

(From our Special Correspondent.)

PHILADELPHIA, September 20, 1884.

COL. WILLIAM LUDLOW, Chief Engineer of the Water Department, submitted to City Councils on Thursday of this week a general "report on the pollution of the Schuylkill River between Flat Rock and Fairmount dams, or between the highest and lowest pumping-stations of the department," by Assistant Engineer Dana C. Barber, and a report of sanitary analyses of the waste-water from some of the largest mills draining into the river within the same limits, by Dr. A. R. Leeds, of Stevens Institute. The following is a brief summary of some of the more important instances of pollution:

By far the greatest amount of dangerous foreign matters entering the river below Manayunk (a manufacturing suburb) is from the extensive carpet, blanket, and cloth mills of John and James Dobson, located on a natural run near the river only about a mile and a-half above the Belmont pumping-station, supplying West Philadelphia, and two and a-half miles above Spring Garden, which supplies the greater portion of the city proper. At these mills 45,000 pounds of wool is scoured per day, and enormous quantities of dye-stuffs and chemicals used, some of the largest quantities being as follows: 235 lbs. ammonia, 674 lbs. archil liquor, 245 lbs. brimstone, 715 lbs. Glauber's salts, 2,351 lbs. chipped logwood, 505 lbs. oil of vitriol, 344 lbs. sal-soda, and 349 lbs. soda-ash. The proprietors claimed to have a process for recovering the waste matters from cloth-scouring, but since they refused permission to inspect their mills it was not learned how fully this was accomplished. All other liquid waste products were acknowledged to enter the river directly, without any purification. To ascertain the amount of this pollution a weir was built at the mouth of the stream. The ordinary dry-weather flow was found to be about 70,000 gallons per hour. Samples were taken at the mouth of the stream and above the mills at times of this average flow, and analyzed by Dr. Leeds, who found that the amount of readily decomposable organic matter was nearly 400 times greater at the mouth than above the mill, and more than 500 times greater than in the river above Flat Rock dam on the same day, and that in every gallon of the water at the mouth there were 2.92 grains more of dissolved solid matter than above the mills. The same stream receives waste-water from a few houses, and small quantities of other pollution very trifling in comparison with that from the mills. Dr. Leeds' conclusion on this case is that "its influence upon the waters of the Schuylkill River is to destroy their wholesomeness and fitness for drinking purposes."

The case of the Riverside Mansion, which had water-closets connected directly with the river, has been already noted in these columns, as also that of Stelwagon's paper-mill, the proprietors of both of which establishments were recently arrested and put under bonds for trial. Dr. Leeds made an analysis of the waste-water from the latter place, and found it to contain $12\frac{1}{2}$ grains of impurity to the gallon, a large portion of which consisted of organic filth, and 230 times more albuminoid ammonia, and 1,500 times more free ammonia, than the river at the upper pumping-station.

The banks of the river and canal at Manayunk for about a mile (four to five miles above Spring Garden pumping-station) are occupied almost entirely by manufactories—cotton and woolen mills, paper-mills, and dye-houses. The largest woolen-mills are those of Seville Schofield, Son & Co., where 25,000 pounds of wool is scoured per day, and all the waste run into the river directly. In scouring cloth this firm uses a process for recovering the waste-grease and solid matters, thereby effecting a large saving to themselves and keeping much filth from the river. They are also careful to save all privy-waste and remove it to their farms; but the urine is caught and used in wool-scouring. At the cotton-mills of the Campbell Manufacturing Company, now idle, but employing 700 operatives when running, the cess-pools have an overflow directly to the river. Many of the smaller mills have privies over the water, or direct water-carriage to the river for excrementitious matters from (in all, at the present time, when some of the largest mills of this sort—notably the Ripka Mills, employing 500 persons—are idle) 850 persons.

Three public sewers assist the street-gutters in carrying to the river the waste-water from over 1,300 houses in Manayunk. As the streets are generally steep, running back up an abrupt slope to the river, and the gutters generally well paved, this kind of pollution finds ready access to the river. But few of the houses, however, have water-closet connection with the sewers.

Chief Engineer Ludlow, in submitting these reports, says:

"The Fairmount pool furnishes the domestic supply of over 900,000 people, who must use the water or go with-

out. The importance of protecting this water from pollution cannot be overestimated, and neither the convenience nor interest of individuals can be permitted to offset or annul the duty imposed upon the city authorities to protect the general interest and health.

"I regret to say that the action heretofore taken by the City Solicitor, in conformity with the instructions of councils and by the Board of Health, in recognition of the responsibilities and duties imposed upon it by the law, has up to this time been attended with little result, although several of those affected thereby have expressed their willingness to do whatever may be necessary and practicable to relieve themselves from the imputation of poisoning their fellow citizens.

"It has been urged as an argument against forbidding the manufacturers the use of the Fairmount pool as a cess-pool that the drinking-water should be taken from Flat Rock Dam, and the Fairmount pool abandoned to base uses. But whatever alterations may hereafter be made in the system of water-supply, years would be required for their completion, and meanwhile it is imperative that the daily menace to the health of the city shall be withdrawn.

"Furthermore, even were the Fairmount pool abandoned to-day as a source of water-supply, it would still remain an integral and valuable portion of the park, and for this reason alone its waters should be kept pure and wholesome forever."

THE PLUMBERS' AND DEALERS' TRADE-PROTECTION CONTROVERSY.

We had hoped that it would be unnecessary to return to this subject and that the matter would have been allowed to die out and be forgotten. The conduct of certain dealers, however, in writing letters to various plumbing organizations, seeking to take advantage of what at most was merely a technical mistake quite likely to happen in the heat of a controversy, has kept alive the agitation in various quarters, and excited the wrath of some honest men, who seem yet unable to appreciate the real situation, apparently believing the plumbers have been placed in a false position through trickery on the part of certain members of the dealers' committee. We have therefore continued our investigations, and here give in detail the circumstances as we believe they actually occurred, in order that those of our plumbing readers who take any further interest in the matter may at least see how the letters they have received and statements that have been made are calculated to mislead. By a reference to our article of September 11, it will be seen that we took the view that the dealers possibly made a mistake in addressing their letter to Mr. Young, though we then believed it was a perfectly natural mistake to make, in view of the fact that Mr. Young called the meeting, and though he left the chair after reading the Baltimore resolutions from a newspaper slip, he did nothing to indicate his want of approval of the demands made by the New Yorkers, which the plumbers of the country have been so quick to repudiate, but he gave them his moral support and made the remark at this conference that the demands might as well be signed, as "it would only take ten minutes." The only demands that any one capable of comprehending the English language would consider demands were those submitted in a formal way by the New York committee, and written on a type-writer. These were definite propositions which the dealers could either reject or accept. Before these were offered Mr. Young, as before stated, took from his pocket a newspaper slip and read to the gentlemen assembled the resolutions passed at the Baltimore Convention. He then laid the slip on a table and the formal demands of the New Yorkers were submitted and considered, Mr. Young leaving the chair, but remaining in the room and taking part in the deliberations. As evidence that this committee, countenanced by Mr. Young, thought there was nothing unreasonable in the demands and that they should be acceded to at once, one of the members of the plumbers' committee stated bluntly and plainly, "There, gentlemen, are our demands; either sign them or keep your goods." Mr. Young's remark that "there was no need to take the demands away, as they might as well sign them and it would only take ten minutes, naturally led the dealers to believe that he was thoroughly in sympathy with them, and was present to give his moral support as President of the National Association to the New Yorkers' demands. Subsequent developments, as we will hereafter show, indicate that there was ample justification for that assumption. To show that there was no attempt or design on the part of the gentlemen who signed the dealers' agreement to deceive or mis-

represent any one, the following should be borne in mind: When the meeting adjourned Mr. George Lane, who acted as secretary of the dealers' committee, folded up the plumbers' demands in type-writing and Mr. Young's newspaper slip with the other papers he had and took them away.

Subsequently he attended the meeting of the dealers' committee, when the reply was framed and signed; and in the following letters he explained the circumstance of not presenting the newspaper slip, which incident has been seized upon as the basis of a new issue, thus drawing attention from the points involved:

NEW YORK, September 26, 1884.

J. A. MACDONALD, *State V.-P., N. A. M. P.*

DEAR SIR: In order to correct a misunderstanding in which I am charged with suppressing or concealing the Baltimore resolutions (a charge which I most emphatically deny), I take this opportunity to state to you and the trade generally just where I stand in the matter. After the joint meeting held at the United States Hotel August 14, in order to facilitate business I volunteered to notify the different dealers and manufacturers to meet and consider the propositions then submitted by your association. Shortly after, Mr. Byrne informally handed me a copy of the New York resolutions, together with the Baltimore resolutions, the latter in the shape of a printed slip cut from some newspaper. By accident I mislaid the printed slip, and was unable to find it in time to hand it in at the meeting of the manufacturers and dealers held at the United States Hotel August 19. I stated the above facts at that meeting, and was given to understand that as the meeting was called to consider the New York resolutions, the absence of the Baltimore resolutions was of no consequence. In conclusion, permit me to express my deep regret that any unpleasant feelings should have originated from such misunderstanding, and to assure you of my earnest desire now as in the past to further the best interests of the trade.

Yours respectfully,

GEORGE LANE,

Of Mayor, Lane & Co., 161 East 54th Street.

The following letter was sent on September 29, in which Mr. Lane's statement in the letter of the 26th is qualified and explained:

J. A. MACDONALD, *State V.-P., N. A. M. P.*

DEAR SIR: In reading over the draft of the letter sent to you on the 26th inst., I find that one of the statements needs some qualification. I have been reminded that I made no reference to the newspaper slip containing the so-called Baltimore resolutions at the dealers' meeting. In making the statement on that point in my letter referred to I was in error. My remarks about the newspaper slip were made to some gentlemen, whose names I do not remember, in the room before the meeting was convened, and they replied that it was of no consequence, as the meeting was called to consider the New York and Brooklyn demands. To the best of my recollection nothing was said at the conference by me about the so-called Baltimore resolutions. I hasten to make this correction and explanation in order to do justice to my colleagues, whom I believe acted in perfect good faith, as I most certainly did.

Very respectfully, GEORGE LANE.

The formal demands in type-writing, which were the only ones which had been discussed at the previous conference with the plumbers, were recognized by all who signed the dealers' reply as the ones that they had heard debated, and after the signatures of those present were secured, their reply attached to the type-writer demands were sent by a messenger to several firms who were not at the meeting for their signatures. These signatures, we are entirely satisfied, were procured in perfect good faith, and the document was, most naturally, addressed to Mr. Young, the gentleman who had come in an official capacity from Chicago, and had called the conference. If any mistake was made in addressing him, Mr. Young could have returned the reply and requested the committee to send it to the Chairman of the New York committee. That would have settled it there and then. He, however, issued an inflammatory and intemperate appeal to the plumbers of the United States. Moreover, just at the same time two firms in this city received letters from Chicago countermanning orders that had been sent to them within forty-eight hours, and from other quarters there was every indication that boycotting was to be resorted to. Under these circumstances the letter to the architects was prepared and sent. The wisdom or the propriety of that proceeding it is not now necessary to consider, since men when they are taken by the throat are not apt to act as deliberately as they do under other circumstances. When the publication of the New Yorkers' outrageous demands caused a storm of indignation from plumbers, as well as the public, Mr. Young's friends saw fit to convey the idea from Chicago that the President of the National Association was in no way responsible for the demands and was not in sympathy with them, and simply desired an expression of opinion on the views adopted by resolution at Baltimore.

We now propose to publish a resolution that has come into our possession within the past week, to show that the President of the National Association of Master Plumbers was in sympathy with the demands of the New Yorkers; and further, that the moral support he gave the Brooklyn and New York committee was strictly in conformity with a prearranged programme and his instructions, and that he did what his colleagues on the Executive Committee expected him to do, and what from the published speeches of at least one of them was considered entirely practicable. The following resolution was unanimously adopted by the Executive Committee of the National Association of Master Plumbers, in Chicago, on July 21, the following gentlemen being present: Andrew Young, Chicago, President; J. J. Wade, Chicago, Recording Secretary; James Allison, Cincinnati, 1st Vice-President; W. H. Graham, St. Louis, Treasurer; Jeremiah Sheahan, St. Louis; John Sanders, Chicago; Martin Moylan, Chicago; Alex. W. Murray, Chicago; Thomas Havey, Chicago.

[Copy of resolution adopted by the Executive Committee of the National Association of Master Plumbers of the United States, July 21, 1884.]

Resolved, That the Executive Committee of the National Association recommend that members of the National Association do not purchase of any house that sells to a non-member in a city whose local master plumbers' association has incorporated the following in its rules and regulations: "That they will not purchase material of any house which sells to any party except he belongs to the 'Master Plumbers' Association' of said city."

[The above resolution was moved, seconded, and adopted.]

From a reading of this resolution it is evident that a good deal of sympathy has been wasted on the President of the National Society, and altogether too much blame saddled on the New Yorkers for a blunder which nobody now seems willing to assume any responsibility for, and for which the Executive Committee of the National Association is largely responsible.

The debates at Baltimore and the resolution above quoted indicate that it was the deliberate purpose of the Executive Committee, of which Mr. Young was the head, to carry out this utterly impracticable scheme; and it seems very evident that Mr. Young came to New York with the idea of using his influence to secure the assent of the New York firms to this arrangement, believing that if successful here he would then have a triumphant trip through the various cities of this country.

We have evidence that we believe to be reliable that Mr. Young's manner and conversation, both at the committee meeting and prior to it, indicated his faith in his ability to secure such a result. We therefore respectfully submit to the plumbers of the United States, who are unwilling to see the national and local plumbers' organizations wrecked, whether it is not high time that their executive committee, which we understand is to meet in St. Louis this month, should not adopt a resolution to the effect that this whole trade-protection business should be laid on the table until the next meeting of the National Association. The members of this committee, with one or two exceptions, we have not the pleasure of knowing, but from the reported remarks of Mr. Graham, of St. Louis, at Baltimore, it is quite evident that this gentleman honestly believed that it was within the powers of the plumbers' societies of the United States to secure the adoption and practical enforcement of these ridiculous demands. And this gentleman is an influential member of the Executive Committee of the National Association.

The speeches made at Baltimore make it evident that certain delegates thought that men who belonged to societies should buy goods on more favorable terms than plumbers who did not, one delegate proposing that the members of the society should buy goods ten per cent. cheaper than other men. This was during the debate that was followed by the vote adopting the so-called Baltimore resolutions about which so much talk has been made, and which were merely an expression of what certain plumbers thought should be done—that is, if A did one thing, B should do another. In conclusion, since the plumbers are being misled and incited to further agitation by letters from dealers, hinting and suggesting trickery on the part of their colleagues, we have thought it desirable to give this detailed explanation, and we give it as our opinion that since men like Messrs. Graham, Young, Wade, Blackshaw, and Allison evidently honestly and earnestly believe in the efficacy and practicability of the measures that the mass of the plumbers of this country seem disposed to repudiate, it seems only fair, with all respect to these gentlemen as individuals, to suggest that they should desist from using their position

on the Executive Committee to push the scheme outlined in the Executive Committee's resolution printed above, until the wishes of the National Association are made known at its next convention. The apologies made for Mr. Young and most of the articles we have seen that attempt to defend his course have assumed that he was not at all in sympathy with measures that it appears he is largely responsible for. We have seen nothing from Mr. Young that indicates that he was not in favor of the New York demands. In his official capacity he has sanctioned and undertaken to push an impracticable and impossible scheme, as this resolution clearly shows. He has, therefore, only one of two things to do—namely, at the next meeting of the Executive Committee secure the adoption of a resolution, frankly admitting that a mistake has been made, and that the resolution of July 21 should be expunged as dealing with a matter beyond the control of a national association; or else come out squarely, and defend its wisdom, proceed to carry it out, and drive from affiliation with the National Association the best men in it, and thus wreck the organization.

BLUNDERING IN PHILADELPHIA.

An old friend, a good plumber, and an honest man writes us a letter, in which he introduces a matter by saying "your late notable prejudices against the plumbers," etc. To all such we respectfully submit that it is the duty of every friend of plumbers and plumbers' societies to speak out plainly on questions of importance to the craft. If entertaining an honest belief that the recent and contemplated movements to secure what is called trade-protection for men engaged in the plumbing business are impracticable, that they will only result in injury to those who expect a benefit, that they will encourage trickery and subsequent ill feeling, and that this question cannot be handled by societies at all—then we must rest under this imputation, and await events to prove the correctness of our position, and the wisdom of telling truths, however unpleasant it is to see them recorded. No one could want a better illustration than the recent action of the Philadelphia Plumbers' Society right in the face of what has recently transpired.

We have received from our correspondent in Philadelphia a printed copy of an agreement presented by the Executive Committee of the Master Plumbers' Association of Philadelphia to the dealers for their assent. Our correspondent states that the belief is prevalent among master plumbers that the dealers will approve of the propositions submitted at an early date, or at most slightly modifying the agreement, so that it will meet the approbation of the plumbers. As an act of simple justice to the plumbers of Philadelphia and of charity to the individuals who are directly responsible for those propositions, we have excluded them from our columns at this time. They will have no other effect with the public than to convey the impression that plumbers make $33\frac{1}{3}$ per cent. profit on all work that they do, when as every one familiar with the facts knows that this has no foundation in fact. In one case it is proposed to ask that on all goods sold $33\frac{1}{3}$ per cent. difference should be demanded, or "as much as will be considered sufficient to secure the protection needed." The last sentence obviously nullifies the practical force of the $33\frac{1}{3}$ per cent. limitation, yet the mention of the $33\frac{1}{3}$ per cent. will leave the impression that that is the profit that plumbers expect to get. We have frequently shown that on small jobs and small transactions $33\frac{1}{3}$ per cent. would be an inadequate profit on the materials used, while on any large work or any large transaction, running into thousands of dollars, it would be extortionate and unwarrantable. Therefore, these suggestions give a misleading impression as to what respectable plumbers' profits actually are.

The proposition that a manufacturer should never repair an article that he may have made is another absurdity. There are men to-day members of master plumbers' societies that are utterly unable to repair some of the appliances that they put up in houses and that they have been allowed to make a profit on. To demand that a manufacturer will not take every precaution to protect the good name of his wares from the effects of the stupid work of botchers is another absurdity. The proposition that any plumber waiving any portion of the discount agreed upon, as might be proper in large percentage jobs, should "be dealt with as not entitled to the regular trade discount," is another outrageous demand. The proposition that the manufacturers and dealers shall stop selling goods to small consumers, as fast as possible, is about as indefinite and unintelligible as most of the ridiculous propositions that lie before us.

With all due respect for the personal character and honesty of the men who claim to speak for the plumbers' societies and plumbers of their respective cities, we desire most emphatically to reaffirm the position that we have hitherto taken, and that is, that it is utterly futile for the dealers and manufacturers of this country to enter into any compact that they can afford honestly to abide by that will satisfy these men for thirty days.

Any manufacturer or firm with self-respect and a desire to be honest will find, if they have not realized it hitherto, that the only safe and proper course for them to pursue is to sign no compact, hold no conference with committees, and recognize no societies on so-called trade-protection questions. It is right and proper that they should extend to their customers reasonable protection, and that they should honestly do as they agree, but this concerns nobody other than the dealer and his customer.

In justification of the position we have taken, it is only necessary to cite the action of the New York plumbers about a year since. They then made demands about as impracticable as those that have been considered within the last few weeks. At that time bulldozing had not been begun; no bad blood had been stirred up. Manufacturers met with them and at these conferences agreed to certain propositions. The men who represented the plumbers at this conference when the demands were signed and agreed to, though greatly less than first put forth, congratulated the dealers present, expressed their great pleasure at the result of the conference, and thought it would have the effect of removing all difficulties and "elevating the trade."

When the arrangement was printed and read at leisure by themselves and their associates, it dawned upon them that the English language therein employed meant very different things from what this committee supposed at the conference. Since that time, therefore, restless and impracticable men began an agitation practically repudiating this arrangement, with the very natural result of precipitating the muddle of the last few weeks. The attitude of the men who are now speaking for the New York societies, likewise of the men who are speaking for the Philadelphia society, in letting the public understand that they have submitted their demands on the same principle that a Chatham Street second-hand clothes-dealer sells his goods—namely, to ask three times as much as he expects, and to take what he can get—suggests a method of doing business that belies the practice of honest men in the plumbing business, and is consequently an insult to these men.

It is very evident from the propositions that the various plumbing societies are constantly putting into print, that the men responsible for framing them are utterly unable to comprehend the true meaning and effect of the language employed. Indeed, it is necessary for somebody to subsequently explain what their demands mean in plain English as understood by the rest of mankind; consequently there should be some check on men who are in position to print matter that subjects the plumbers of the United States to ridicule.

We repeat our sincere conviction that the more the plumbing societies print documents about trade-protection, and endeavor to carry out their ideas on this question, the more will they misrepresent the true interests of the plumbing trade, and injure it in the estimation of the public; and if they will only keep up the agitation, it will not take very long for even the most thick-headed among them to realize the truth of this assertion.

We have again and again repeated our sincere conviction that this question of trade-protection cannot in any way be settled by agreements with plumbers' societies on the one hand, and committees of dealers on the other. That matter must rest entirely with the individual plumbers and the individual manufacturers or dealers, and we have predicted that if the National Association declines to accept that view of the situation that it will result in the wrecking of that body, and in driving from the local associations their most influential members. We have frequently had occasion to criticize stupid things done by men who claimed to speak for the plumbers of New York. Indeed, a considerable experience has demonstrated that it is not difficult to secure a committee of plumbers who could avail themselves of any opportunity to get on the wrong side of a question, but in this particular controversy it seems hardly fair that New Yorkers should bear all the blame. The men who championed it here were quite as honest as the men who championed it in St. Louis and Chicago, and we believe quite as misguided. We trust that at the meeting in St. Louis the Executive

Committee of the National Society will see its way clear to lay the business on the table until the next annual meeting of the association. Meanwhile we shall endeavor to indicate some of the difficulties to be met with, and our idea of what may be accomplished in practice.

EVIDENCE of more blundering on the part of the New York and Brooklyn plumbers' societies reaches us as we go to press. We will allude to it in our next issue. How much longer are these men to be permitted to issue printed matter that subjects plumbers to ridicule?

A NATIONAL ASSOCIATION OF JOURNEYMEN PLUMBERS PROPOSED.

DELEGATES from journeymen plumbers' societies in various cities of the United States held a meeting in New York during the past week, in response to the following call:

To the Plumbers and Gas and Steam Fitters of the United States, wherever found organized, greeting:

BROTHERS—We, your brothers of New York, believing the time has arrived when our social, intellectual, and industrial welfare demand that our craft, throughout the whole country, should take steps for the formation of a national organization, and being encouraged by words of cheer received from different sections of the country, address you this circular, for the purpose of obtaining your co-operation, aid, and advice in such movement.

We need not dwell on the great and urgent need of such a step at this time, when we are confronted by the fact that the employers are spreading and perfecting their national organization, and that all such organizations on the part of the employers, whether intended or not at the start, inevitably lead to the injury and oppression of the toiler. We earnestly wish to see it otherwise; and believe that the true interest of both demands that the relations between labor and capital should be harmonized. But it appears that such cannot be the case until employers learn to forget that arrogance which is so galling to the feelings of honest workmen, who are often their superior in everything that makes a man worthy of the name. Besides, the history of the labor struggle proves beyond a doubt that the only way by which labor commands respect is by being able to defend itself; that the trades which have been best organized have received the highest reward for their toil, and have the least number of strikes or lockouts. Nor should we forget that with organization on the part of the employer and the aid of the telegraph and railroads, men can be taken from one part of the country, and in a few hours thrown into any part in which a strike or lockout exists, thereby beating us in detail.

We need a liberal and comprehensive system of national organization to guard against such things. Let us adopt for our motto, "An injury to one is the concern of all," so that at such a time we could send word all along the line for men to remain at home, and, if need be, send financial aid, thus securing victory beyond all doubt. When that time has arrived strikes and lockouts will be things of the past, and arbitration will have taken their place.

As thinking men, you cannot have failed to discover that there are many things in connection with our calling which demand our early and serious consideration, among which may be mentioned the apprenticeship or "helper" question.

At present we are forced to give to any boy who may be sent with us our knowledge of the business, which is our capital, without any recompense whatsoever, unless, indeed, it be the recompense of being turned out of employment, to make room for him. This is an evil which is staring us in the face, and which must be met, but it cannot be met by any local action, as that would be local in its effects only. It requires the general and concerted action of all sections to make it of permanent and general benefit.

Guided by our convictions and reassured by words of cheer from different parts of the country, we feel that the time is ripe for such a movement, and that our best interests demand that we take it, and therefore we ask your aid in it, and shall be guided by the response received from all points. As soon as possible you will be advised of the results of this circular. We remain yours, fraternally,

N. Y. Journeymen Plumbers' Society—Patrick Coyle, President, Geo. W. Flood, Rec. Sec'y.; Brooklyn Plumbers' and Gas-Fitters' Society—Neil B. McBride, President, James S. Campbell, Rec. Sec'y.; New York Gas-Fitters' Society—Christopher Gaynor, President, E. W. St. John, Rec. Sec'y.

JOHN A. COLE and Benezette Williams have made a report to the trustees of Hyde Park, Ill., embodying a plan of sewerage for forty-two square miles of the village, which is very flat. It is proposed to have a double system of sewers, one for sewage and one for storm-water, the waters to be collected at two pumping-stations, and the storm-waters to be discharged into open ditches leading to Lake Calumet. The sewage-water is to be pumped on land prepared for intermittent downward filtration, as at Pullman.

THE Lynn, Mass., Water Board is considering the advisability of raising the dam of the storage-reservoir, Birch Pond, about ten feet, and thus increasing the storage capacity about 250,000,000 gallons.

Correspondence.

CREDIT TO WHOM CREDIT IS DUE.

PHILADELPHIA, September 25, 1884.
To the Editor of THE SANITARY ENGINEER:

MY attention has just been called to the foot-note appended to your notice of the Medical History of the Greely Survivors, which appears in your issue of September 18, page 363, in which you state that "the paper from which the facts in this article are extracted was printed in the *Medical News* of September 6 and announced as specially prepared for that journal by Surgeon Green. The same paper appears in the Boston *Medical and Surgical Journal* of September 4."

This foot-note, I am informed, has been construed as a reflection upon the accuracy of our announcement, and I therefore ask the privilege of saying in your columns that our statement is absolutely correct. The article was prepared by Surgeon Green expressly and solely for the *Medical News* and paid for by it. That it was so prepared the Surgeon-General of the Navy was aware, but in its official course through the Bureau of Medicine and Surgery, copies were made by his direction and sent to three other journals, which explains the appearance of the article elsewhere.

It may interest your readers to know that the article as it appears in the *News* was corrected and revised by Surgeon Green and additional details were appended which are not to be found in the report as published in the other journals.

Very respectfully yours,

EDITOR OF THE "MEDICAL NEWS."

[In preparing an abstract of the medical history of the survivors of the Greely expedition, printed in our issue of September 18, we mentioned in a foot-note that we found Surgeon Green's paper in more than one of our medical exchanges, but that it was announced by the *Medical News* as specially prepared by Dr. Green for that journal. Our only object in that note was to make sure of giving full credit to the sources whence we obtained the facts; certainly no thought of casting discredit on the statement of the *Medical News* was in our minds, nor do we think we were so understood by any number of readers. We, however, very gladly publish the above letter.—ED. SAN. ENG.]

INTERPRETATIONS OF PLANS AND SPECIFICATIONS.

—, September 2, 1884.

WILL you please place your interpretation on the following question in construction?

Where specifications say that "all interior walls" shall be built of a certain construction, and that the said specifications shall govern where anything is not consistent with them on the plans, and a note on the plans require a different construction for the dome walls up to the first story than are required for "all interior walls" in the specifications, would you or would you not consider dome walls to be interior walls? Nothing is said in the specifications about dome walls.

I send you a diagram of the basement, which shows the walls of the building. Respectfully, W. L. R.

[In our opinion if the pencil memorandum referred to was on the plans when the estimates were made and at the time of the bidding, the contractors should be bound by that memorandum, notwithstanding the clause in the printed specifications referred to. In this opinion three of the leading architects in this city concur.]

PIPE FOR CONVEYING WATER.

NEW YORK, September 25, 1884.

To the Editor of THE SANITARY ENGINEER:

I DESIRE to conduct water to my house from a spring a mile distant. The spring has a fall of some seventy feet. Several pipes have been recommended, and I would like your opinion upon the relative merits of galvanized wrought-iron and the plain wrought-iron which is coated both sides with coal-tar. How long will 1-inch pipe treated with tar-nish last, and would it pay to lay 1½-inch pipe instead of 1-inch, in order to make allowance for the pipe being clogged with rust? Is the pipe less liable to rust when the water passes through it continuously than if drawn from it at intervals? In other words, should not the water be drawn from a distributing-reservoir at the end of the pipe with an overflow, instead of from the main? In the former case it seems to me the pipe would be continually cleansed of rust, while in the latter it would accumulate in the bends of the pipe and eventually stop it. Would it be of any service to me to use 1½-inch pipe for the down grade and 1-inch pipe for the up? The water must rise and fall 150 feet before it reaches its destination.

E. K. ROSSITER.

[The relative durability of galvanized and tarred pipe depends very much on the character of the water. In some waters galvanized pipe corrodes more rapidly than in others, and in the absence of analysis no positive answer can be given to this question. It is impossible to say how long tarred pipe will last; in all probability it will last many years. It would be better to use 1½-inch than 1-inch pipe. The pipe is not less liable to rust when the flow is constant, but the water drawn from it is more likely to be fresh and sweet, as it does not lie in the pipe. It would not be of any service to use two sizes of pipe. On the contrary it would be a disadvantage.]

CHICAGO NOTES.

(Regular Correspondence of THE SANITARY ENGINEER.)

HEALTH COMMISSIONER OSCAR C. DE WOLF, of Chicago, has received the compliment of being elected a member of the British Association for the Advancement of Science.

I asked Dr. De Wolf about the sanitary status of this city and its safeguards in event of an epidemic. He said that Chicago's recent death-rate—19 per 1,000—compared favorably with any city. Resources would be abundant should cholera invade the city, and he thought that all American cities were likely to be visited next year. Half a million dollars could be raised here in a forenoon for sanitary work. Already the city was prospectively divided into forty-five districts, with a competent medical man provided for each; every one with his disinfecting corps and apparatus. Already a site was selected for a temporary hospital, which would be built in three days should an emergency require; for this hospital trained nurses had been bespoken, fifty members of the Catholic sisterhoods being at command in fifty minutes, and fifteen of them already in the service of the department. A selected corps of men was in training to board, one hundred miles out, all trains coming to this city. Besides many extraordinary precautions, the ordinary work of the health department included the following: Every tenement-house in the city has been under supervision since May 1, and every tenement has been lime-washed, and in many of them important sanitary improvements have been accomplished. One hundred and ninety tons of freshly-slacked lime have been thrown over wet yards and areas, and into dirty street-gutters; 5,000 privy-vaults (without sewer-connections) have been thoroughly cleaned and disinfected up to September 1. Our garbage is safely removed outside of the city by railroad; our water-supply from Lake Michigan is ample and of the purest, and there is not a well in the city limits. We are swept out, as with a new broom, every day, every crack and cranny, by breezes from lake and prairie, so that with her natural and acquired helps and resources Chicago is in pretty fair shape, it would seem, to grapple with an epidemic of any kind. It was a good work, too, Dr. De Wolf thought, that was now going on, the replacing of wooden pavements by something more healthful.

A call is issued from this city by Secretary J. J. Wade, of the Executive Committee, National Plumbers' Association, for a meeting of the Committee, October 15, in St. Louis, that date and city being selected that the members may attend the sessions of the American Public Health Association.

Reviews.

HOSPITAL CONSTRUCTION AND MANAGEMENT. By Frederic J. Mouat and H. Saxon Snell. Part II. 4vo. London: Churchill, 1884.

The first part of this valuable work was noticed in THE SANITARY ENGINEER some time ago, and it is with much satisfaction that we record its completion by the issue of this second *fasciculus*. The part now before us contains plans and descriptions of a number of important typical hospitals, including the Lariboisière, new Hotel Dieu, Tenon, or Menilmontant, St. Denis, and Bichat hospitals, of Paris; the Bourges Military Hospital, the Saint Eloi, at Montpellier; the Utrecht and Amersfoot hospitals, in Holland; the Halle University Hospital, the St. George's Union Infirmary, in London; the Hospital of St. Andrew the Apostle, at Genoa, and the Johns Hopkins Hospital, at Baltimore, with several others, and, with the first part, forms a very complete storehouse of information with regard to the principal modern hospitals of the world.

One could wish, it is true, that all this information had been classified more completely than it has been, and that

the authors' own views should be given more fully, but they explain that to do this would have required more time than they could spare, promising, however, that it may be done hereafter in a supplement.

Meantime, they have furnished a good index, by means of which one can readily find what is given with regard to any special detail of construction, such as ventilation, in the description of each institution. They have also provided three very interesting tables of summaries, showing the date of erection, number of beds, cost, amount of wall, floor, and cubic space per bed, etc., from which we take the following:

NAME OF HOSPITAL.	No. of Beds.	Cost per Bed.	Cubic Space per Bed, in feet.	Window-Glass per Bed, in feet.	Date of Erection.
Herbert Military.....	650	\$16 50	1,315	18.8	1860-4
St. Thomas.....	573	38 85	1,886	32.5	1868-71
Edinburgh.....	586	23 85	2,200	38.8	1870-9
St. Marylebone.....	744	8 05	936	14.5	1879-81
Antwerp.....	780	18 40	2,525	28.3	1878-84
Halle.....	496	16 65	2,207	26.0	1876-84
Lariboisière.....	613	21 60	1,850	.....	1853
Hotel Dieu.....	566	60 75	2,230	21.9	1866-76
Genoa.....	428	32 70	1,538	.....	.....
Johns Hopkins.....	361	43 30	1,675	28.0	.....

The authors very properly remark that in making a comparison of the relative cost of various hospitals it is important to bear in mind the dates of erection, because the prices of building materials and labor have, in all countries, advanced from 20 to 30 per cent. and more within the last ten or twenty years. To this it may be added that the difference in cost of labor in different countries is also to be taken into account, as, for example, in the case of the Johns Hopkins Hospital, which would have cost much less if constructed in Germany.

Of the various European hospitals described, the new one of the University of Halle is in many respects the most interesting and the most satisfactory. It is not the purpose of this notice, however, to comment on the relative merits or demerits of the various hospitals described; each large hospital is a problem by itself, which must be considered with reference to the special circumstances of the case. The intelligent sanitarian or architect will learn something from each one.

The part before us concludes with a chapter on the organization of medical relief in London, in which the present system, or want of system, is severely criticised; some interesting statistics are given, and a large degree of centralization of authority is proposed as a remedy. Omitting special and fever hospitals, and those for the insane, London now has 15,584 beds in hospitals devoted to general sickness, accidents, and injuries. There are, in addition, about 1,470 beds for infectious fevers, and 3,250 beds in special hospitals. The authors agree with Dr. Oppert, in thinking this amount of accommodation adequate, if it were properly distributed, and the beds were occupied only by those who are really too poor to pay for medical attendance at their own homes. But they urge that many of the beds are occupied by those who are able to take care of themselves and should not be objects of charity, and that, therefore, a certain number of the really poor and deserving are crowded out; that "the funds of the endowed hospitals are no longer sufficient to fill their wards or to fulfill their purposes; that the voluntary institutions are beginning to consume their capital, without increasing their subscriptions; that the distribution of the means of treating the sick and injured within reasonable distance of their homes has not followed or kept pace with the movements of the population; that the expropriation or compulsory change of domicile of the poor or laboring classes is not preceded, as it ought to be, by the provision of proper and efficient means of making the unavoidable removal as little irksome as possible; that the most deserving classes of the sick poor do not obtain the relief they need in acute attacks of disease as quickly as the successful treatment of such diseases demands; * * * that their pauperization by the occurrence of accidents or diseases for which they are in no way responsible is neither just nor equitable; and that it is to the interest of the community in general, and the advantage of the sick and injured in particular, who are unable to bear the cost inseparable from such afflictions, that the State should grant its aid * * * by taking the relief of sickness into its own hands to at least the same extent as it controls the relief of destitution * * * by supplementing the resources of all the

existing general hospitals of the metropolis by grants in aid from a common fund." * * *

While there is no doubt that the complaints against the existing system are well founded, it should not be forgotten that the same complaints may be made of the system in any large city, such as New York or Paris; and if State aid is needed for the London hospitals it either is or soon will be for those of Manchester, Liverpool, etc. We doubt very much whether the particular plan of organization of "Hospital London," proposed in the work before us, would give satisfactory results, but the proposal that the whole matter should be carefully investigated by some competent and trustworthy authority, such as a Royal Commission, is one that should meet with general approval and support, and it is to be hoped that it will be speedily carried out.

We also fully indorse the proposition that all public institutions for the treatment of the sick poor should be instruments of instruction. This is in fact a necessity if the patients are to receive the best medical treatment, and it is because the hospitals for paupers which are provided by the London vestries are not connected with any medical schools, and are not used for clinical instruction, that the patients in them do not have the benefit of the best medical talent, and that it is difficult for any one to say whether they receive proper treatment or not.

The work of Dr. Mouat and Mr. Snell is one which we advise our readers to procure and study if they wish to know about hospital construction in modern times.

TWENTY-SIXTH DETAILED ANNUAL REPORT OF THE REGISTRAR-GENERAL OF BIRTHS, DEATHS, AND MARRIAGES IN SCOTLAND. (Abstracts of 1880.) 345 pp. 8vo. Edinburgh, 1884.

This is a continuation of a series of valuable reports well-known to all vital statisticians. From the summary report prefixed we learn that the estimated mean population of Scotland for the year was 3,705,994, of whom 1,783,950 were males and 1,922,044 females. The number of births registered during the year was 124,570, or 33.6 per 1,000; 10,589 of these births, or 8.5 per cent., were returned as illegitimate. For every 100 female live births there were 104.9 male live births. Among the illegitimate the proportion was 110 male for every 100 female births. The number of deaths registered during the year was 75,803, or 20.45 per 1,000, which is less than the average for the last 10 years, which was 21.79.

In the towns having over 25,000 inhabitants the rate was 24.2. In the towns having between 10,000 and 25,000 inhabitants the death-rate was 22.4. In the small towns of from 3,000 to 10,000 inhabitants the mortality was 20.2. In the mainland rural districts it was 16.3, and in the high land rural districts it was 15.7. The proportion of deaths has usually diminished in proportion as the space at the disposal of the people increases, the greater the crowding the higher being the mortality. Of the total deaths 22.6 per cent. of males and 18.3 per cent. of females died during the first year of life. During the first five years the percentage of deaths is 40.01 of males and 35.25 of females. In 1.5 per cent. of the total deaths the cause of death is reported as unknown. Of the specific contagious diseases whooping-cough stands at the head of the list as a cause of death, it having produced 35.3 deaths out of every 1,000 deaths where the cause is specified, or in all 6,641 deaths. Scarlet fever causes 2,165 deaths, or 29 per cent. of all deaths from specified causes. Diphtheria causes 1.56 per 1,000 of the deaths in the mainland rural districts, 9.3 per 1,000 in the towns having above 25,000 inhabitants, and 10.9 per 1,000 in the towns having from 10,000 to 25,000 inhabitants.

The comments upon the figures made in a report to the Registrar-General, by Dr. J. B. Cunynghame, take up the subject of weather and its influence on the mortality, showing that diphtheria and croup were most effectual in September and October, whooping-cough in April and May, scarlet fever from September to December, measles in April, fevers in May, and that in the case of children under the age of five years the greatest mortality occurred during the months of March and April, and the lowest during July. The tables showing in detail the causes of death in the large cities, the small towns, and the rural districts furnish valuable data for the study of the effects of the aggregation of human beings upon their health, and especially so when these are taken in connection with the similar tables contained in reports of preceding years. Such statistics are a necessity for scientific sanitary work, and it is greatly to be regretted that in this country we have thus far done so little to secure them.

SEVENTH ANNUAL REPORT OF THE HEALTH COMMISSIONER, CITY OF ST. LOUIS, for the fiscal year ending April 7, 1884. 8vo.

General John D. Stevenson, the Health Commissioner of St. Louis, assumed charge of the department November 9, 1883. His report is brief, and is mainly a summary of the reports of his subordinates, which are given in full. The tables of mortality given by Dr. Carson, the Clerk of the Board of Health, show a death-rate of 20.4 per 1,000 for an estimated population of 400,000. There were 62 deaths from small-pox in the city, and 146 at the small-pox hospital. The greater part of the document is taken up with the reports of the superintendents of the hospitals, insane asylum, etc. General Stevenson remarks that the general condition of these institutions is satisfactory, in view of the fact that they are all overcrowded, and are in construction and general appliances not equal to the demands made upon them. It seems evident from the reports that additional buildings are badly needed. It is to be hoped that in his next report the Commissioner will be able to give more details as to the sanitary condition and requirements of the city.

A NARRATIVE OF THE ORIGIN AND FOUNDATION OF THE HOSPITALS ASSOCIATION. With an account of the Inaugural Meeting. 36 pp., 4to. London, 1884.

This is a brief account of the origin of a society organized in London in February last by a number of persons connected with various branches of hospital administration, and the objects of which are stated to be: "(1) To facilitate the consideration and discussion of matters connected with hospital management, and, where advisable, to take measures to further the decisions arrived at; and (2) to afford opportunities for the acquisition of a knowledge of hospital administration, both lay and medical."

This is a little indefinite, but probably this was a necessity to secure harmony. Some of the promoters of the movement for this organization wished to have changes made in the present system of hospital relief in the metropolis, and had been advising the appointment of a royal commissioner to investigate the subject, but this part of the programme seems to have been abandoned in order to secure the co-operation of the hospitals, and to induce them to send representatives and get advice, as stated by Major Ross, M. P. (p. 25).

It is to be hoped that the society may educate its members in hospital hygiene and management, and learn something of the practical difficulties of keeping a hotel for sick people, before it undertakes to advise those who have had experience in that business.

POISONING OF SODA AND MINERAL WATERS.

COMMISSIONER OF HEALTH RAYMOND, of Brooklyn, has just issued the following order:

DEPARTMENT OF HEALTH,
BROOKLYN, September 25, 1884.

By virtue of the power conferred upon me by law I do hereby declare the following practices dangerous to public health, and do prohibit the same in the city of Brooklyn:

First.—The storage, keeping, selling, or having for sale of soda-water or mineral-waters in tin-washed copper fountains or vessels.

Second.—The storage, keeping, selling, or having for sale of soda-water, mineral-waters, syrups, or flavoring extracts in vessels composed in whole or in part of copper, lead, or other poisonous substance in which the soda-water, mineral-water, syrup, or flavoring extracts come in contact with the copper, lead, or other poisonous substance.

Third.—The selling, delivering, or draughting of soda-water, mineral-water, syrups, or flavoring extracts through pipes, faucets, or taps composed in whole or part of copper, lead, or other poisonous substance, unless such pipes, faucets, or taps are so lined, coated, or protected as that the soda-water, mineral-water, syrup, or flavoring extracts cannot come in contact with the copper, lead, or other poisonous substance composing the same.

J. H. RAYMOND, M. D.,
Commissioner of Health.

In laying the foundation-stone of the new hall for the Butchers' Company, in Bartholomew-close, opposite the City of London Union offices, Mr. Kilby, master of the company, remarked that the first butchers' guild was established so long ago as 1180, in the reign of Henry II., and its first charter was granted by James I., in 1606. It was somewhat strange that after having drifted about for so many years they were now settling down on a piece of ground which was situated within a few yards of the original site. The cost of the hall will be £7,658.

CASES OF METALLIC-POISONING.

PROFESSOR MASSE, of Bordeaux, has recently reported two cases (man and wife) of lead-poisoning from the use of refuse painted wood as fuel. The food cooked over the coals became impregnated with the poisonous metal, and produced unmistakable symptoms of lead-poisoning. In this case it is probable that the lead was first reduced to the metallic condition; that the melted lead was then volatilized and converted into oxide of lead in the air, and that the oxide of lead was the form in which the lead was taken into the system. A year or more ago Dr. Napias reported (*Revue d'Hygiène*) several cases of lead-poisoning among makers of musical instruments. The tubes of certain instruments are bent by filling them with melted lead, which becomes solid on cooling, and makes it possible to bend the brass tubes without their buckling. The lead is then melted out in an open fire, and allowed to flow into the ashes; a portion, however, is of necessity volatilized, and occasionally produces injurious effects.

Two cases of mercurial-poisoning have been recently reported (in the *Berliner Klinischen Wochenschrift*) by Dr. Neukirch, of Nuremberg, both of which were due to the presence in the dwelling-rooms of mirrors or looking-glasses, from which the quicksilver evaporated into the air of the room. In both cases the "silvering" was found to be very imperfect, and easily rubbed off with the finger. One mirror was quite new, but when the wooden back was removed it was found to be covered with minute globules of mercury on the side next to the mirror. How far these cases justify the author in recommending the disuse of glasses silvered with mercury admits of discussion, considering the enormous number in use and the rarity of cases of poisoning.

TIN-LINED LEAD PIPES RECOMMENDED FOR USE IN NAPLES.

FROM our French exchanges it appears that the Health Commission of Naples, having expressed its preference for tin-lined lead pipes, Dr. Margotta decided that "the only safe pipes are lead pipes plated with tin in the inside, for such pipes may be looked upon as tin pipes coated with lead." And such pipes were hence recommended to the municipal authorities of Naples.

We question whether any considerable length of tin-lined lead pipe in actual service presents an unbroken lining of tin with no lead exposed, and whether it consequently can be looked upon as a continuous tin pipe coated with lead. Experience in this country does not justify the wisdom of this recommendation.

USE OF SALICYLIC-ACID FOR ARTICLES OF FOOD.

IN France the use of salicylic-acid for preserving articles of food has been prohibited. In the *Journal d'Agriculture* M. Barral continues to protest against this measure, as it rests on prejudice alone. On all sides, in different countries, this prohibition is severely criticised. Thus M. Barral has received letters to this effect from Professor Atfield of London, Dr. Blas of the University of Lourain, and Dr. C. Meyer of Lenzburg, Switzerland. In all of these countries the use of salicylic-acid is permitted, it is constantly employed, and without evil effects to any one; and it seems very desirable that in France this decree be repealed, and in its place perhaps be issued a regulation that would effectually check any abuse of this valuable substance.

THE Springfield, Mass., Water Commissioners have asked the City Council to appropriate \$450,000 to lay an additional main from Ludlow reservoir to the city, as the practical capacity of the present main has been reached.

ACCORDING to the *Journal für Gasbeleuchtung*, a factory is being erected in Berlin for the commercial electrolytic production of metallic magnesium and aluminum. The plant will embrace four large dynamos, driven by a 100 horse-power engine, and it is expected that at first 150 kilos of metal will be produced daily, at a cost of about twenty marks (say \$4.80) per kilo.

THE escape of steam from the New York Steam Company's pipe, in the area of the Mercantile Bank building, 191 Broadway, on September 16, was caused by the blowing out of the "bonnet"—i. e., nut and stem of a 2-inch brass body-valve. The screw-thread was either defective, or had been stripped by an incompetent workman. The escaping steam did no injury to persons or property, and was shut off in about ten minutes.

FRANCE—*Rheims*.—Week ending September 6: Deaths, 75; annual death-rate, 47.5 per 1,000. Typhoid fever caused 6 deaths, consumption 2, diarrhoeal diseases 30, and violence 1.

BELGIUM—*Brussels*.—August 24-30: Deaths, 232; annual death-rate, 28.2 per 1,000. Small-pox caused 2 deaths, scarlet fever 1, typhoid fever 1, diphtheria 4, whooping-cough 3, diarrhoeal diseases 84, acute lung diseases 10, and consumption 33.

ITALY—*Turin*.—August 17-23: Deaths, 103; annual death-rate, 20.4 per 1,000. Small-pox caused 5 deaths, typhoid fever 5, diphtheria 4, whooping-cough 1, diarrhoeal diseases 36, consumption 10, and violence 4.

RUSSIA—*St. Petersburg*.—August 17-23: Deaths, 488; annual death-rate, 28.7 per 1,000. Small-pox caused 6 deaths, measles 5, scarlet fever 3, typhoid fever 14, diphtheria 13, whooping-cough 8, diarrhoeal diseases 121, and acute lung diseases 56.

DENMARK—*Copenhagen*.—During the week ending September 2 there were 123 deaths, which is equivalent to an annual death-rate of 23.9 per 1,000. Measles caused 4 deaths, croup 1, whooping-cough 2, typhoid fever 2, diarrhoeal diseases 27, consumption 9, acute lung diseases 3, and violence 3.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Sept. 27.....	23.85	18.19	22.86	29.03	28.66	18.29

E. G. LOVE, Ph.D., *Gas Examiner*.

THE Siemens' regenerative system of firing retorts has been adopted at the Glasgow Gas-Works.

THE gas company of Leipsig has received permission from the municipality to establish a station for furnishing electric-lights.

THE Dublin Municipal Council have under consideration the advisability of constructing corporation gas-works.

THE Philadelphia (Westinghouse) Natural-Gas Company announces that it is ready to make contracts for supplying gas.

THE telegraph and telephone companies in Philadelphia are somewhat aroused by the order of Supt. Walker requiring them to put their wires underground before January 1, 1885.

A COMPANY has been formed at Findlay, O., to develop the supply of natural-gas obtainable there. Wells already supplying gas have been sunk to a depth of about 150 feet only.

MR. G. E. DAVIS, at a recent meeting of the Society of Chemical Industry, stated that a process for the extraction of benzine from coal-gas would shortly be put in operation at the Rockingham Gas-Works. The residual gas, which has little illuminating power, is to be used for heating the retorts.

THE trunk lines of the Chicago Fire-Alarm Telegraph have been placed underground in La Salle and Washington Streets, and the underground system will be extended as fast as possible. It is thought that the entire cost of putting police and fire-wire plant underground will be about \$150,000.

THE New York *Telegram* says of the Newport electric-lights: "Whenever the moon ought to shine, then it is supposed to shine, and the lights are turned out, and the greater part of the city left in darkness. If a dense fog should roll in and obscure the moon, or a heavy rain-storm take place, and make everything of an inky blackness, then that, as they say in the law, is the 'act of God,' and it would be flying in the face of Providence to have light where He means darkness to prevail."

Association News.

EXECUTIVE COMMITTEE MEETING OF THE N. A. M. P. OF THE U. S.—We are requested to give publicity to the following:

Notice.—There will be a meeting of the Executive Committee of the National Association of Master Plumbers of the United States held in St. Louis, October 15, 1884. As this meeting will be a very important one, it is necessary that all members of the committee should be present.

A. YOUNG, President.
J. J. WADE, Secretary.

BALTIMORE MASTER PLUMBERS.—The regular meeting of the association was held at its rooms in Knapp's Hall, Holliday Street, September 18, 1884. Mr. D. B. Foster, First Vice-President, presided. The meeting was well attended. After the transaction of the regular business the discussion on protection between President Young and the Eastern manufacturers was taken up, and the action of President Young, of the National Association of Master Plumbers, was approved. A motion was adopted to appoint a committee to notify the Eastern manufacturers and dealers that the members of the association would deal with none but those who agreed to the resolutions on protection adopted by the convention of master plumbers in Baltimore.

NEW ENGLAND WATER-WORKS ASSOCIATION.—The annual fall meeting was held at Newton, Mass., on September 24. The entire day was given up to the celebration. The programme included the visiting of the Newton water-works, filter-basin, Boston water-works, and inspection of the Newton Fire Department and the Wabau Hill and Chestnut Hill reservoirs. The party of guests arrived at West Newton at 10 o'clock. After a hearty welcome had been extended to all by President E. W. Cate, of the Newton Water Board, the points of interest laid down on the programme were visited, and an inspection of the Newton Fire Department, under the supervision of the superintendent, Henry L. Bipby was made. The famous Boston Water-Works Aqueduct, over Charles River, was next visited. Engineer Fitzgerald of the Boston Water-Works, who was present, gave those who desired an opportunity to descend into the aqueduct and inspect the interior. After lunch a short business meeting was held at the Woodland Park Hotel. After it had been called to order by the President, Mr. C. R. Walker, Superintendent of the Manchester, N. H., Water-Works, stepped forward, and in behalf of the association presented Mr. R. C. P. Coggershall, Superintendent of the New Bedford Water-Works, and formerly secretary of the association, with a gold-headed cane. Mr. Coggershall had hardly recovered from his surprise when he received another beautiful present from Mr. W. R. Billings, it being a large steel engraving. In the evening a complimentary dinner was tendered the association by the citizens of Newton, at the Hotel Vendome, Boston, and among the after-dinner speakers were Mayor Kimball, of Newton; G. A. Ellis, President of the New England Water-Works Association; Mr. R. M. Pulsifer, of the Boston *Herald*; Mayor Cummings, of Somerville; Col. Hagget, of Lowell; and President Kingsley, of the Cambridge Water Board. Both the entertainment of the evening and the excursions of the day proved in a high degree enjoyable and instructive. The New England Association was organized June 21, 1882, and comprises 71 members, all managers of water-works being eligible to membership. It meets twice a year in different places in New England.

FIRE ENGINEERS OF CHICAGO.—At the session of September 10, several papers were read on "Spontaneous Combustion," in some of which it was held that granite was a poor building material in this regard, because it contained recesses which filled with water, and had superinduced explosions. Other papers of a technical character were read.

SANITARY PROTECTION ASSOCIATION, NEWPORT, R. I.—At the monthly meeting of this society, September 9, letters were read from Mr. Charles F. Wingate, of New York, giving an account of the Tenement-House Commission's progress. It was also voted to place conspicuously in the office of the association the official designs prepared by Mr. Bowditch, of Boston, for the National Board of Health, as to filth, foul cesspools, wet cellars, etc. Also, that in all cases where complaints of nuisances were made to the association, the complaint should be entertained and laid before the city authorities, on the payment of a membership fee by the complainant.

Notes.

CONSTRUCTION.

WASHINGTON, D. C.—Suits have been entered in the Court of Claims against the United States for damages caused by the extension of the Washington aqueduct just begun. The plaintiffs are the Chesapeake & Ohio Canal Company and the Great Falls Manufacturing Company. The damages claimed aggregate nearly \$1,000,000.

BROOKLYN, N. Y.—Bids were opened September 22 for constructing a new police-trial room in the Municipal Building, and were as follows: H. E. Wells, \$924; Miller & Heany, \$491; R. J. Brown, informal; H. D. & W. A. Southard, \$634.

THE contracts for building the railroad bridge between Duluth and Superior, across St. Louis Bay, were given out on September 19. Salpaugh & Co., of Minneapolis, are to build the truss; the Detroit Iron-Bridge Building Company, the pile bridging; and Winston Bros., of Minneapolis, the timber-bridging. The entire bridge will be nearly one mile in length.

WASHINGTON, D. C.—Bids for building a church at the corner of Eighteenth and N Streets, and also separate bids for the lecture-room, which may be constructed first, were opened on September 22, and awarded to Bright & Humphrey at \$96,000 for the entire work and \$23,000 for the lecture-room only. Other bids were by William Morrison, \$97,000, and by W. B. Downing & Bro., \$99,000.

CHICAGO, ILL.—An association has been incorporated by W. A. Stiles, H. R. Newman, and A. Podrasnib, which proposes to erect a Casino on Wabash Avenue, at a cost of about \$80,000.

ST. PAUL, MINN.—The contract for plumbing and gas-fitting in the large Hotel Ryan, now building, has been given to P. V. Dwyer & Co.

BOSTON, MASS.—I. N. Tucker has been awarded the plumbing contract in the Hotel Cushing; cost, \$4,000.

LONG BRANCH.—Architect J. M. Merrick, of New York, has prepared plans for a \$75,000 frame and brick hotel to be erected at Long Branch. Mr. Jacob Rothschild is the owner, and the contract for building has not as yet been awarded.

MILWAUKEE, WIS.—Proposals were opened at the general offices of the Milwaukee, Lake Shore & Western Railway Company in Milwaukee on September 17, for constructing the company's ore docks at Ashland. The structure is to be 1,400 feet long, 40 feet wide, and 46 feet high, and will cost in the neighborhood of \$600,000. Awards of the contracts have not yet been given out.

CUMBERLAND ISLAND, GEO.—Tate & Munden, plumbers, of Pittsburg, Pa., have the contract, at \$30,000, for the plumbing and gas-fitting of a large granite residence, built for Thomas M. Carnegie, of Pittsburg.

ATLANTA, GEO.—The contract for the new Georgia Capitol was awarded, on September 26, to Miles & Horn, of Toledo, O., for \$862,756. The stone to be used is Indiana oolitic stone, from the Salem Stone and Lime Company, of Louisville, Ky.

BROOKLYN, N. Y.—Plans and specifications for the new Hall of Records were opened September 22, and the special committee will report in favor of one of the plans this week. Five plans by different architects were submitted. The total estimates were: Plan 1, \$250,000; plan 2, \$261,000; plan 3, \$247,920; plan 4, \$237,000; plan 5, \$249,332. The architect of plan 2 did not give separate estimates for the different departments of the work. Specifications of the other plans were: Masonry, plan 1, \$130,000; plan 3 (including fire-proofing), \$147,000; plan 4, \$116,000; plan 5, \$249,332. Iron-work, plan 1, \$35,000; plan 3, \$54,920; plan 4, \$41,000; plan 5, \$52,000. Plumbing and gas-fitting, plan 1, \$28,000; plan 3, \$6,500; plan 4, \$5,000; plan 5, \$4,200. Heating and ventilation, plan 1, \$25,000; plan 3, \$8,500; plan 4, \$7,500; plan 5, \$10,500. Carpenter's work, plan 1, \$25,000; plan 3, \$26,000; plan 4, \$64,000; plan 5, \$13,000. Painting, plan 1, \$4,000; plan 3, \$5,000; plan 4, \$3,500; plan 5, \$2,100. Plan 5 also specifies \$21,000 to be applied to fire-proof depositories.

ONE of the two 25,000-pound cylinders for the 15,000-gallon pumping-engine building by the Holly Company for the Buffalo Water-Works, was cast on September 4. It is a low-pressure cylinder, with a 66-inch bore. The entire engine is to cost \$83,000. The Water Commissioners are expending about \$25,000 in improvements at the pumping-station.

THE Jersey City Board of Public Works has elected John W. Ellison Water Purveyor, in place of Robert B. Coar.

SOME Minneapolis people complain that boys swim in the river opposite the intake-pipe of the water-works, and thus pollute the water-supply.

GOVERNMENT WORK.

DREDGING SCHUYLKILL RIVER.—Proposals for dredging between Point Breeze and Girard Point were opened on September 23 at Philadelphia. The National Dredging Company, of Wilmington, bid 28 cents per cubic yard, and the American Dredging Company, of Philadelphia, 31½ cents. Contract awarded to the former. There are about 75,000,000 cubic yards to be dredged.

WASHINGTON, D. C.—In his annual report, the architect of the Capitol, Mr. Edward Clark, recommends the extension of the steam-heating apparatus now being placed in the east wing to the whole building.

IMPROVEMENT OF PROVIDENCE RIVER.—Col. Elliott's report states that it is proposed, during the coming year, to carry the 25-foot channel 300 feet wide to the deep water of Narragansett Bay, to remove the boulders at the mouth of the Pawtuxet, and if funds are left, to excavate a portion of the anchorage-basin above Field's Point.

ERIE, PA.—Abstract of bids for brick and stone work: D. H. Tilden & Co., \$26,764; P. G. Straub, \$19,985; Henry Shent, \$14,768.06; Donnelly Bros., \$21,600; A. Dall, Jr., \$14,847; J. McCarthy, \$22,650; Noble, Lyle & Collingwood, \$24,450; W. R. & W. Haven, \$16,963.

QUINCY BAY, ILL.—Synopsis of proposals for dredging received by Capt. Ruffner: J. W. Hersey, Burlington, Iowa, \$11,700; C. S. Whitney, Keokuk, Iowa, \$12,421.25; C. L. Williams, Keokuk, \$8,400; A. J. Whitney, Keokuk, \$8,550; H. S. Brown, Quincy, Ill., \$8,400; B. E. Linehan, Dubuque, Iowa, \$13,650. Contract awarded to H. S. Brown.

CHICAGO, ILL.—Bids for dredging harbor: Green Bay Dredge and Pile-Driver Co., Green Bay, Wis., 24½c. per cubic yard; Dodge & Petrie, Little Falls, N. Y., 24c. per cubic yard; Fitzsimmons & Connell, Chicago, Ill., 24c. per cubic yard; Chicago Dredging & Dock Co., Chicago, Ill., 23½c. per cubic yard. The contract has been awarded to the Chicago Dredging & Dock Co.

BUTTERMILK CHANNEL, N. Y.—H. Du Bois' Sons are awarded contract for dredging at 33 cents per cubic yard. The Morris Cummings' Dredging Company bid 43 cents.

MISSISSIPPI RIVER.—Bids for furnishing rip-rap on Government barges between St. Paul and Hastings were rejected as excessive. They were: S. J. Truax, Hastings, Minn., 74½c. per cubic yard; total, \$7,450. S. W. Chase and F. M. Underwood, Minneapolis, Minn., 74c. per cubic yard; total, \$7,400. A. H. Truax, Hastings, Minn., 69c. per cubic yard; total, \$6,900.

NEW ORLEANS, LA.—The new bids for removing wrecks have been submitted to the Secretary of War, with a recommendation that they should be rejected. The first bids met the same fate.

BUFFALO, N. Y.—Bids for repairs on break-water, opened by Captain Maguire: David McConnell, Buffalo, \$10,042.40; Daniel E. Bailey, Buffalo, \$8,735. Contract awarded to latter.

KENOSHA, WIS.—Bids opened by Captain W. L. Marshall for superstructure and repairs to piers: Knapp & Gillen, Racine, Wis., \$3,582.22; C. H. Starke, Milwaukee, Wis., \$3,733.90; G. H. Sager, Kenosha, \$3,348.45. Contract awarded to G. H. Sager.

GRAND MARAIS, MINN.—Only bid for dredging in harbor was that of Williams & Upham, who were awarded the contract.

NEWBURYPORT HARBOR, MASS.—For removing sunken ledges, G. W. Townsend, of Boston, bid \$26 per cubic yard, measured in place, and S. S. Andrews, of Biddeford, Me., bid \$38. Contract given to G. W. Townsend.

WILMINGTON HARBOR, CAL.—Only one bid for dredging, from W. D. English, Alameda, Cal., at \$2 per yard outside and \$1 inside Deadman's Island. New bids called for.

CANARSIE BAY, N. Y.—Abstract of bids for improvement, opened September 17: E. Brainard, New York, dredging 43c. per cubic yard, completing dike \$16.90 per lineal foot; H. Du Bois' Sons, New York, dredging 35c., dike \$29.37 per lineal foot; Atlantic Dredging Co., New York, dredging 43c. Contract awarded to H. Du Bois' Sons.

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THE GOOD RESULTS OF SANITARY WORK.

THE *Journal of the Statistical Society* (London) for June last contains an interesting paper, by Dr. G. B. Longstaff, on the recent decline in the English death-rate, considered in connection with the causes of death.

Starting with the fact that while from 1838 to 1875, inclusive, the death-rate of England averaged 22.3 per thousand, it has averaged only 20.3 per thousand for the eight years 1876-83, he proceeds to examine the changes that have taken place in the death-rates at different ages in the two sexes from various causes of death, in order to determine just where this gain has occurred.

The result of this investigation is that the chief decrease has taken place in the deaths from fever, cholera, small-pox, scarlet fever, diarrhoea, and measles, and that from the principal zymotic diseases there is a net decrease of 1,375 deaths per million. The death-rate from consumption has declined at every age, while the mortality from lung diseases other than phthisis has increased. Cancer has increased. The decrease in the total mortality has been chiefly in those under twenty years of age, and has been greater among females than in males. There is some increase of mortality in the latter years of life, but the whole amount of useful working life has sensibly increased.

The results of the inquiry are very encouraging for those who take an interest in sanitary matters, since they show that a marked decrease has occurred in those diseases against which sanitary effort has been chiefly directed for the last ten years.

REMOVAL OF TELEGRAPH-POLES.

JUDGE VAN BRUNT, in the Supreme Court of this State, has rendered a decision continuing the injunction obtained by Henry Clausen & Sons against the Baltimore & Ohio Telegraph Company, restraining said company from maintaining telegraph-poles and wires in front of the Clausen brewery in Second Avenue. The telegraph company claimed the right to place its poles in the street without the permission of the plaintiffs, having already received the consent of the city authorities, and that the plaintiffs had no interest whatever in the street which made their permission necessary. The judge says the corporation of the city of New York is possessed not of the absolute fee of the land in the streets, but only of so much of the fee as enables it to comply with its trust duty of opening and maintaining streets; and that the owners of land abutting on the streets have a right to the free use of light, air, and access to their land, a right which they have bought by paying assessments imposed on them for the benefits resulting to them from the opening of the streets.

"It is urged," Judge Van Brunt says, "in the case at bar that the telegraph-pole does no injury whatever to the land of the plaintiff, in that it does not obstruct the light, air, or access to any portion of the building now erected on it. This is no answer to the present application. The abutting owner has an absolute interest and right to the light, air, or access to his premises arising from the opening of the street upon which his premises abut, and which he has bought and paid for, and no person has the right to interfere with such light, air, or access, not simply in respect to the building which may be now upon the premises, or in respect to the use to which the premises may now be applied, but in respect to any building which such abutting owner

may see fit in the future to erect upon said premises, or in respect to any use to which he may apply them. If, therefore, the pole in question will interfere with or obstruct the light, air, or access to any building which the abutting owner might erect, or render more difficult the access to the premises under any use to which they might be applied, such owner is entitled to claim that the pole shall not be erected until proceedings have been instituted to acquire the right so to do. The question is, therefore, does this pole constitute such an obstruction?"

With regard to the law passed by the last Legislature of this State requiring all telegraph-poles, etc., to be removed from the streets before the 1st of November, 1885, it was argued by council that it was impracticable for a telegraph company to successfully operate its lines if placed underground. The decision holds that the court has nothing to do with this question, and that the Legislature having passed the law it is the duty of the court to enforce it. The law (which will be found on page 78 of the present volume of THE SANITARY ENGINEER) requires that all telegraph, telephonic, and electric-light wires and cables shall hereafter be placed underground, and the act took effect immediately. This section evidently makes it illegal to put up in future any of the wires referred to in any city included in the act. The second section requires every corporation or association owning or controlling any of these wires or poles to have the same removed from the surface of the streets before the 1st day of November, 1885. The next section requires the local authorities to remove all poles and wires in case the law is not complied with within the time specified. It is clearly the meaning of the act that after its passage no telegraph or electric-light wires shall be erected in this city, and also that all existing wires and poles must be removed before November 1, 1885. There is every prospect that the law will not be voluntarily complied with by the various companies, and doubtless some attempt will be made in the next Legislature to modify or repeal the act.

It behooves the city authorities, however, so far as the poles and wires which are controlled and used for the purposes of the municipal fire-telegraph are concerned, to remove them without unnecessary delay, and so set an example to the telegraph corporations of a prompt compliance with this law.

THE NEWARK SEWERAGE PROBLEM.

THE ordinance passed by the Newark Common Council ordering the preliminary steps to be taken for carrying out the plans recommended by Messrs. Schaeffer and Fteley and indorsed by Col. J. W. Adams and Mr. Rudolph Hering was not signed by the Mayor, in consequence of a protest having been made by a number of citizens who were afraid that a "job" was concealed somewhere in the undertaking. Mr. Bless, who is himself an owner of property in the district affected, and who, we believe, honestly thinks that his plan of temporary relief by means of storage-ditches, bailing-wheels, and flushing by impounded tide-water is both economical and practicable, in spite of the opinion to the contrary expressed by the experienced engineers above named, was mainly instrumental in exciting the opposition to the adopted scheme. A largely attended meeting of the protestants was held on the evening of September 30, at which the matter was discussed at length and the arguments presented by Alderman Connolly in favor of the

engineers' plan were strong enough to cause the meeting to emphatically indorse it, leaving Mr. Bless apparently alone in his opinion that there was either extravagance or corruption in the scheme which they advised.

To any person familiar with the character and professional standing of the engineers who recommended these plans, the idea of imputing to them either ignorance or fraud seems too preposterous to be entertained for an instant. It is not altogether unnatural for persons entirely ignorant of engineering matters and familiar through sad experience with the impositions of political tricksters, to suspect that an undertaking involving the expenditure of half a million dollars may be merely a cover for a gigantic "steal," particularly when a fellow citizen and taxpayer claims to know of a cheaper plan for accomplishing the same object. It is always well in such cases to have a thorough investigation of the matter, and in a sensible community the result will generally be, as it has been at Newark, that the project which is well digested and based on sound engineering principles will be chosen in preference to one which depends on a theory, plausible at first sight, but based on defective knowledge of important laws of physical science.

We learn that signatures are being procured to a paper prepared at the New York Master Plumbers' Association meeting of September 26. It may be useless for us to suggest that those signing it do so with the mental reservation that they can afford to abide by it till they hear that some one else has violated it, and that fact seems to facilitate the getting of signatures. As this so-called agreement is framed it cannot and will not be adhered to in this city one week; we can give our reasons for this prediction in a subsequent issue, if it is thought necessary, though it is quite likely that in the meanwhile the fact will be practically demonstrated. Signatures, however, seem to be more important than performance with some men, as will be seen by a further reference to this subject on another page.

THE City Council of Pittsburg, Pa., is considering the form of a law which it is proposed to ask the Pennsylvania Legislature to adopt, providing for the payment, out of general taxation, of the cost of surveys, plans, and construction of "main public sewers," "not less than thirty inches in orifice," and limiting the annual expenditure to the amount of a tax of two mills on the dollar of valuation of taxable property. The principle is sound, but it is not easy to understand why the limitation as to size was inserted. It is easy to conceive of a sewerage district which may not require a 30-inch sewer for its outfall-drain, and yet be as important as one that does need a sewer of that size.

In the advertising columns of the Boston *Herald* we find the record of the conviction of one Walter C. Townsend, of 152 Sumner Street, East Boston, for the offense of having in his possession adulterated milk, with the intent to sell the same. This public exposure in the pillory, as it were, of offenders of this sort is required by the Massachusetts law, and must be an extremely disagreeable, and therefore effective, punishment. To be publicly advertised as a dealer in adulterated goods is not likely to improve such a man's custom or reputation, and it is to be hoped that similar punishment will overtake the scores of yet undetected violators of food-adulteration laws.

DR. H. B. BAKER, Secretary of the Michigan State Board of Health, and Dr. V. C. Vaughan, report on four outbreaks of cheese-poisoning in that State. One hundred and sixty-four persons in all were taken with the same symptoms—pain, and a burning sensation in the stomach, vomiting and purging, feebleness of the pulse, and coldness of the extremities. All finally recovered. The cheese had the appearance of an ordinarily good article, but on cutting a liquid oozed into the pores. Analysis showed no arsenic, copper, or other mineral poison; but the liquid mentioned,

which was strongly acid, was found to contain microscopic organisms. It was suggested that a cheese which gave a strong acid reaction should be looked upon as suspicious.

IMPROVING THE SANITARY CONDITION OF HOBOKEN SCHOOL-HOUSES.

WE are indebted to Mr. L. R. McCulloch, Clerk of the Hoboken Board of Education, for a copy of the proceedings of the board on Monday evening, September 8. From the report of the Committee on Repairs, it appears that the suggestions and comments made some months ago as to the sanitary condition of the Hoboken schools have not been entirely ignored in the way of examination and improvement. In Hoboken, as Mr. McCulloch informs us, there is no superintendent of schools, the entire responsibility resting on the trustees. The Committee on Repairs reports that, in addition to the usual overhauling of stoves, windows, furniture, yards, roofs, cleaning cellars, etc., special repairs tending to improve the sanitary condition of the schools and to abate nuisances and prevent their occurrence have been made. In School No. 1, the old cesspool, which put the lower hall in direct communication with the sewer, has been sealed, and a new one constructed and trapped, while the old water-closet cesspools, which have long been inoperative, have also been removed, and an iron sink with overflow-plugs substituted. In School No. 2, the reports of children and teachers of "horrible smells" were confirmed, the committee finding that the soil-pipe of the south wing terminated in the sinks of the upper room. This and the connecting sinks were trapped, and it is proposed to extend the soil-pipe through the roof, which must be done to stop the stenches. Iron sinks are recommended. For the present the drains were cleaned and the closets tightened. In School No. 3, a very bad state of things was found to exist. The close proximity of the closets, the committee says, had made the air of the lower class-rooms unbearable. New ones were built, as far removed to the rear as possible. In School No. 4, the stench complained of was found to come from the fact that the soil-pipe connecting with the sewer was not trapped, and from want of proper ventilation. The soil-pipe was disconnected and sealed, new urinals were constructed, and the place thoroughly disinfected.

A more dangerous condition of things than was disclosed by this examination of the schools it would be difficult to imagine. That the authorities have at last paid attention to the complaints and suggestions made to them is to their credit.

OUR BRITISH CORRESPONDENCE.

Success of the Health Exhibition—Windermere a Cesspool—Canal along the Mersey—Inner Circle Railway—London Water-Supply—Canterbury Springs—Social Science Congress.

LONDON, September 20, 1884.

THE International Health Exhibition has already proved a greater success than last year's Fisheries, judging from the number of visitors. Counting from last Wednesday the exhibition has been opened 112 days, and during that time it has been visited by 2,753,027 persons, which is more than 50,000 over the total number of visitors to the Fisheries during the whole time (147 days) it was opened. The cause of sanitation will have profited considerably if one-hundredth of this year's visitors have benefited educationally by their visit.

The waters of the Windermere Lake were characterized yesterday by the Chairman of the Kendal Board of Conservators as constituting nothing less than a gigantic cesspool, owing to the sewage which was allowed to flow into them. It is reported that people are afraid to come to Bowness, the centre of the lake district, owing to the discharge of sewage into the lake, which made its waters unfit to drink. Several other members of the Kendal Board also testified to the extensive pollution of the lake by sewage matters.

The engineers retained by the promoters of the Manchester Ship Canal have unanimously recommended the Provisional Committee to adopt the scheme carrying the channel along the Cheshire shore of the Mersey, with an entrance to the River Eastham.

On Thursday Major-General Hutchinson, on behalf of the Board of Trade, inspected the Inner Circle (Metropolitan) Railway and its extensions connecting it with the East London Railway at Whitechapel, and subject to some small alterations, stated he should recommend the Board of

Trade to sanction the opening of the railway for public traffic. The new line will be thrown open to public use on Wednesday, October 1. At present, on the Metropolitan and District Railways, in every twenty-four hours, no less than 1,691 trains—goods and passengers—run. The cost of the new piece of line connecting the two systems and completing the Inner Circle, after deducting subsidies, amounted to £1,034,000, and its length is about 1,200 yards, which is £854 a yard. The Metropolitan and District Railways last year carried upward of 120,000,000 passengers. The new piece of railway will be the joint property of the two companies.

Mr. Crookes, Dr. Odling, and Dr. Tidy report that the excellence of the water supplied during the month of August to London was indicated by its state of aeration, and by its freedom both from color and from any excess of organic matter. Its perfect filtration was proved by the absence of suspended matter in any one of the samples submitted to examination.

The mineral springs at Canterbury, Kent, after having been neglected for more than fifty years, are about to be reopened. These springs, which are in close proximity to each other, contain in one pure chalybeate, and in the other sulphur in combination with iron.

Quite a return of summer has been experienced during the past week in London. The thermometer in the shade has on four days registered over 82°, and the weather has been extremely sultry and close.

Many interesting papers have been read at the Social Science Congress, at Birmingham, during the present week, particularly in the Health Department. Mr. Hamer, in speaking on the subject as to what are the best means, legislative or otherwise, of securing those improvements in the dwellings of the poor which are essential to the welfare of the community, advocated the establishment of institutions, the members of which should visit and educate the people themselves on the subject. He also proposed the creation of a Ministry of Health and Education, considering that nothing short of this would meet the present requirements.

SAFETY-VALVE.

ACCORDING to an exchange, the Russian Government imposes the following restrictions on the employment of children: First, children of the age of from ten to twelve years are only permitted to work during the day in certain specified industries; second, children from twelve to fifteen years are to be allowed to do night-work in spinning and textile factories, as well as in glass-works; third, work is formally forbidden to children under fifteen years in the following branches of industry, among others, in mills where lamb's-wool, felt, hair, feather, and down are worked up; in bleaching-works; in washing, bleaching, and dyeing; in cloth mills, near fulling, tasseling, and shearing machines; in printing and dyeing works; in all unhealthy work in colors; in skin and parchment works, except in some safe employments; in varnishing leather, in grinding bones, in carbonic and turpentine products; in potteries and china-works—for the preparation of material, turning, engraving, polishing, and baking.

THE commission appointed by the Governor of Massachusetts to consider a system of drainage for the Mystic, Blackstone, and Charles River valleys held its first session at Milbury on September 25. The commission consists of John Q. Adams (Chairman), S. B. Stebbins, of Boston, Edward W. Converse, of Newton, E. D. Hyde, of Woburn, and Leverett E. Tuckerman, of Salem, with Eliot C. Ciarke, of Boston, as secretary. The city of Worcester was represented by Mayor Reed, City Solicitor Goulding, and Chief Engineer Allen, while John Hopkins appeared as counsel for Milbury. Testimony was introduced by the Milbury people claiming that the Blackstone was polluted solely by the Worcester sewage, and that since the former hearing the city of Worcester had reduced the summer flow of the river by taking Tatnuck Brook as a source of water-supply.

THE Health Committee of New London, Conn., has appropriated \$350 for a preliminary examination of sewerage plans as recommended by Mr. W. H. Richards. Mr. Richards presented a report showing that levels have been taken and bench marks made establishing the street grades, and suggesting a method of construction and of collecting assessments, the latter modeled after the plan used by the Providence (R. I.) assessment committee and followed in many other cities.

PEST-HOLES IN NEW YORK.

No. III.

AT No. 11 Ludlow Street, in this city, are two tenement-houses, one front 37'x42', and one rear 24'x37', with a small yard intervening. The front building is seven stories in height, and is occupied mainly by Russian-Polish Jews. It contains one workshop, two stores, and twenty-two families, the latter numbering 57 adults and 67 children; while in the rear building there are thirteen families, which, with additional boarders, number 57 adults and 42 children. These are the figures given by the tenants in each apartment (with two exceptions). Nearly every family has in addition to its own members a number of boarders, overcrowding the rooms far beyond the Health Board limit. One apartment on the fourth floor of the rear building, consisting of four rooms, the cubic contents or total air-space of which is 2,255, is occupied by 17 persons, 12 of whom are boarders, the air-space per person being 131 cubic feet. Another similar apartment on the second floor of the rear building is occupied by 13 persons of two families and boarders, allowing but 174 cubic feet of air-space per person. All the apartments in the rear building with but one exception, and many in the front building, are in a very filthy condition. All but the two upper flights of stairs, with their landings, are exceedingly filthy and dark. On the ground-floor of the rear building two apartments in addition to their legitimate use as dwellings, are also used for storage of peddlers' fruits and vegetables, and are literally reeking with filth. The yard is in keeping with the halls and apartments, and contains two privy-vaults, the walls of one of which, built of stone laid with apparently dry joints, has fallen in.

In the front building, in an apartment on the third floor, occupied as a tailor's workshop, one of the 12"x4" ventilating-shafts for the bedrooms is used as a chimney, the pipe from a hot stove on which to warm irons passing into it. Part of the cellar of the front building is converted into a pen for fowls, in which are kept about five dozen chickens, three dozen geese, and two dozen ducks, at all times. In the former part of the week this number is increased. The condition of this pen beggars description. The rooms in the rear of the basement store over this cellar are used for slaughtering and plucking the poultry, and are but little removed from a shambles.

The fire-escapes of both front and rear buildings are all incumbered with bedding and rubbish, and in case of fire would be worse than useless. Many of the tenants of both buildings find sleeping accommodations on the fire-escapes and roofs. The owner is said to be Hyman Korn, 487 Broadway, and the lessee Phillip Bernstein, 77 Hester Street.

PURIFICATION OF WATER.

In the *Verhandlungen und Mittheilungen des Vereins für öffentliche Gesundheitspflege in Magdeburg* for 1883, Dr. Reidemeister proposes as a new method of purifying impure water, a treatment with permanganate of potash, followed by peroxide of hydrogen. The peroxide of hydrogen itself, even when very dilute, is fatal to bacterial life, and its action upon the previously added permanganate of potash determines the formation of a copious precipitate, which, in settling, envelops and drags down particles of clay or other matters already in suspension. The chemical treatment must be followed by filtration.

This suggestion, on account of the high price of the chemicals to be employed, possesses a theoretical rather than a practical interest. The proposal of Professor Cohn, to use permanganate of zinc instead of permanganate of potash, can hardly be considered seriously. Permanganate of soda might, however, be employed.

THE BOWER-BARFF PROCESS.

WE learn from the *Journal für Gasbeleuchtung* that experiments have been made in Bonn with iron articles protected by the Bower-Barff rustless process. The process, which consists in covering the articles with an artificially produced coating of magnetic oxide of iron, has been described in THE SANITARY ENGINEER, Vol. VIII., page 134. Experiments with a cast-iron candelabrum were not satisfactory, the imperfections in the coating producing a tattooed appearance, although the rust did not spread from these unprotected points. Experiments on protected wrought-iron pipes have been begun by the laying of a considerable length of temporary pipe, but the results will not be known until the pipe is taken up a year or two hence.

THE INTERNATIONAL HEALTH EXHIBITION.

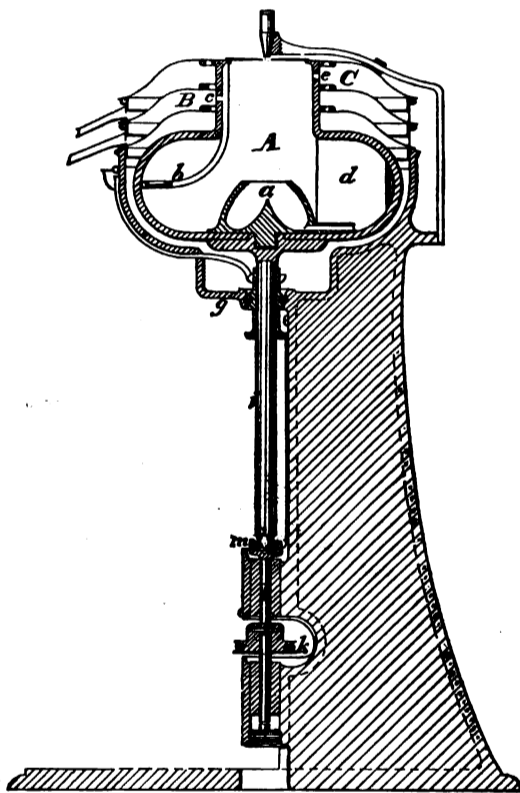
No. XX.

(Continued from page 411.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

THE MECHANICAL SEPARATION OF CREAM.

MACHINES for separating cream from milk by centrifugal action are now very much used in Europe among the best class of dairy farmers. At the International Health Exhibition separators on this principle are shown at work on all the three important dairy exhibits, and form by no means the least attractive part of the display. The mechanical separation of cream is not a new idea, Professor C. F. Fuchs, of Carlsbad, having suggested the process in 1859, and in 1864 the idea was practically carried out at Munich. Apparently, however, the machine used was not a great success, for in 1874 a German engineer attempted to improve on the invention and produced an apparatus in which vessels containing the milk were hung on hooks, mounted on a vertical shaft that rotated at a high velocity. This machine proved a failure, as in bringing it to rest, the milk and cream again combined. Several other appliances of a somewhat similar nature were introduced, principally by German inventors, but the first substantial success was achieved by Mr. F. Wannick, of Brunn, Austria, who produced a comparatively small machine which would skim 125 gallons of milk in ten hours, the separation being completed in from twenty-five to thirty minutes. It was, we believe,



in this machine that the cream was for the first time drawn off during the rotation of the apparatus, so that no skimming, in the proper sense of the term, was acquired. It is on this point that the success of mechanical separation mainly depends. The machine had to be stopped, however, in order to remove the skim-milk, and the action was therefore intermittent, while in the modern type of apparatus which we are about to describe, the work can be carried on continuously. Mr. Wannick's apparatus consisted of a suitable frame and base, carrying a vertical spindle on which the separating-vessel was mounted. It was driven by a belt at a speed of 10,000 revolutions per minute.

The neighborhood of Kiel, in Germany, was the first, or at any rate among the first, of the dairy-farming districts to apply the cream-separating machines on an extensive scale. This was in 1877, when an association of the surrounding farmers was formed for the purpose. The enterprise proved highly successful, and since that date the system has widely spread on the Continent of Europe. The mechanical separation was first brought prominently forward in England by means of the Great Kilburn show held by the Royal Agricultural Society in 1879. Since then "cream-separators" have become, as we have remarked,

of very common occurrence, few dairymen who handle a sufficiently large quantity of milk depending now on the old "spontaneous" system. We give herewith illustrations of De Laval's machine, which is the popular form of separator now in use. The milk is caused to run in a continuous stream into the separating-vessel A, and falls on the conical spreader a, which is surrounded by a cup, as shown. As the separating-vessel revolves with the vertical shaft on which it is mounted, the milk is forced by the centrifugal action through the small pipe at the bottom of the cup, which can be seen in the illustration. On emerging into the vessel A, the heavier constituents of the milk are carried, by their higher specific gravity, to the outer part of the revolving vessel, while the lighter globules of milk-fat, which form the cream, find a place on the inner part of the revolving mass, forming, as it were, a hollow truncated cone. It should be mentioned that a flat plate of metal (or wing), d, is attached vertically to the interior of the vessel A, in order to communicate the full velocity of the apparatus to the contained milk. The machine runs at between 6,000 and 7,000 revolutions per minute, and it will be easily understood that at this high speed of rotation the whole body of milk, or milk and cream, is forced from the axis of the vessel with considerable force, leaving a space of cylindrical form in the centre. The outer part of the annulus of milk and cream thus formed is composed, as we have said, of skim-milk, and as more milk is supplied, this rises through the tube b, until it comes to the opening c, through which it passes into the space B, from whence it again runs out through the pipe or spout shown. As the machine is fed with more milk, additional cream is formed, and this also rises in the vessel until it comes to the orifice e, through which it finds an exit, and from thence passes into the space c, which is likewise fitted with a suitable spout. So long as the machine is in action, therefore, there are two streams, one of skim-milk and the other of cream, always flowing.

These machines are made in Stockholm and require the greatest care to be paid to the details of their construction, as may be imagined from the extraordinary velocity at which they rotate. The power is conveyed through a belt to the small pulley k, which is attached to the short vertical spindle l, that terminates in a cup at m, and which runs in the two long bearings, as shown. The lower end of this spindle is convex and rotates upon a small convex projection, which is adjustable as to height. The lower end of the vertical spindle i rests in the cup m, the latter being bushed with boxwood, which is kept thoroughly saturated with oil. The rotary motion of the lower spindle l is communicated to the upper spindle i by means of the friction between the end of the latter and the boxwood bush. In this way any changes of velocity in the working of the engine are not immediately conveyed to the separating-vessel, and the latter will continue running for ten minutes after the engine has been stopped.

It is absolutely necessary that the machine should run smoothly and without jerking or vibration, as otherwise the cream would be churned and formed into butter, and this action takes place more or less if any means are used to stop the apparatus before it comes naturally to rest.

In order to prevent an undue strain being brought on the neck of the spindle i, by any slight rocking of the vessel, the bearing at g is held in its place by means of an elastic ring, which is plainly shown in the drawing by two small circles. This gives a flexible bearing on the same principle as has been found so advantageous in line-shafting when running at a high velocity. Upon the apparatus being started there is generally a slight amount of vibration, but when it has once settled down to regular work the running is smooth and steady.

The separating-vessel is about three-eighths of an inch thick and is made in one piece out of Bessemer steel, and is turned up true both inside and out. Formerly the vessel was made in two parts and bolted together by flanges, but it was found that however well the joint was made the milk would come through under the stress brought to bear upon it at the high speed of rotation. The bearings are made of cast-steel, the journals being of Bessemer wrought-steel.

In a machine having a separating-vessel about twelve inches in diameter and running at 6,000 revolutions, about forty-five gallons of milk can be separated in an hour. At slower speeds the quantity will be less and the feed will, of course, be proportionately diminished. The respective sizes of the cream and skim-milk orifices regulate the richness of the cream. Thus, if the orifice c be reduced in size some of the milk will flow away with the cream; if, on

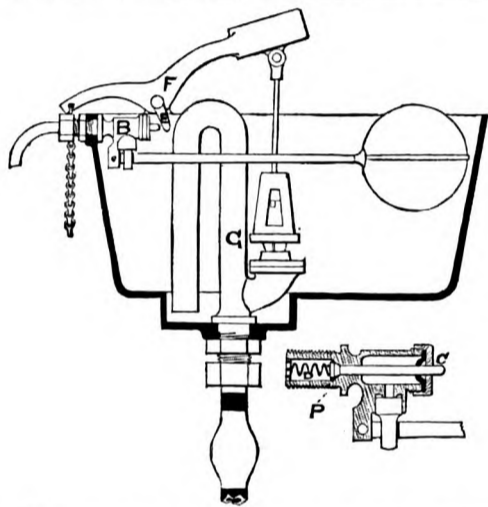
the other hand, the cream orifice be reduced in area, only the very lightest and richest parts will escape through it, a considerable portion of the cream going away with the skim-milk. Naturally, too, the rate of feed has to be proportioned to the size of the apertures or the machine would overflow. The pipe *b* and the wing *d* are arranged to balance each other, so as to reduce vibration and undue strain on the bearings.

The other forms of centrifugal separators shown at the London Health Exhibition are the "Nakskov" and the "Hamburg." The former is a vertical machine, and one of the most noticeable features about it is that the pulley is above, so that there is less danger of the belt getting wet and slipping. This machine runs at about 2,400 revolutions.

The "Hamburg" has a horizontal spindle, which runs in two long bearings, mounted in plummer-blocks, attached to the foundation plate. The two separating-vessels are placed one at each end of the shaft, and rotate in vertical planes. The form of these vessels may be described as that of a couple of large soup-plates placed face to face, the centre part of the outer plate being cut away, so as to form a circular opening to the interior of the vessel.

EAST ANNEX.

Hayward, Tyler & Co., 84 and 85 Whitecross Street, London, E. C. (stand No. 510), exhibit water-closets, syphon and waste-preventing cisterns, hydrants, stand-pipes, and plumbers' brass-work. We illustrate a specialty of this firm, known as Howard's Patent Water-Waste-Preventing Cistern. The specialty in this cistern is the ball-valve B, of which an enlarged sectional view is given in the



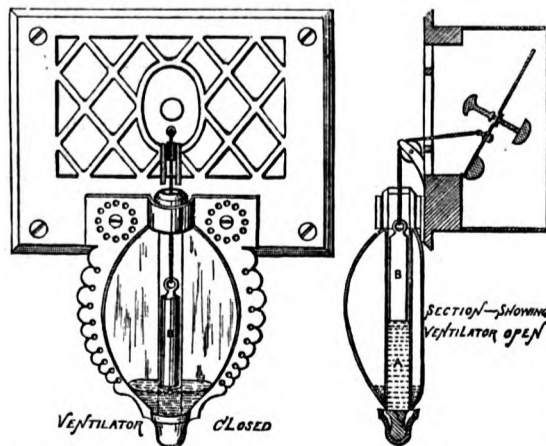
small figure. A small conical plug, P, is arranged in the inlet of the main valve B. The spindle of this plug passes through the front cover, as at C. The plug is kept up to its seat by the water-pressure, assisted by a coiled spring, D.

When the cistern is not in use a projection, E, on the axis of the weighted lever F, bears against the end of the plug-spindle C, forcing the plug from its seat.

On the lever F being raised in order to start the syphon C, the projection E moves away from the spindle of plug-valve, allowing it to close on its seat, preventing any further supply of water so long as the lever F is held up.

CENTRAL ANNEX.

At stand No. 731 Mr. Harcourt Thompson, C. E., of 22 Victoria Buildings, Deansgate, Manchester, exhibits his "mercurial air-valve." It is an automatically-controlled



heat-regulating register for rooms, designed to keep a room at a constant temperature. The action is as follows: As

the temperature of the room rises it causes the air in the hermetically-sealed bottle to expand, and the mercury confined therein to rise in the tube A, in which floats the weighted tube B; as this weighted tube rises the valve opens and releases the hot air from the room through the flue to the roof or elsewhere, where it may be disposed of by the ventilating ridge. As the room cools the mercury falls, and the weighted tube with it, which closes the valve. The agents are Cope & Collingson, 61 Summer Row, Birmingham.

(TO BE CONTINUED.)

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

No. XXIV.

(Continued from page 362.)

DRAINS AND TRAPS.

IN the last paper mention was made of how the London sewers are being bottled up. In addition to the local authorities putting in traps in the street-gullies, each house is, one by one, having a trap placed in the house-drain before it enters the sewer, as many sewers are in such a condition that people are unwilling to incur the risk of using their soil-pipes as sewer-ventilators. Mention was also made as to tide-flaps, as they are commonly called. There are others specially constructed to prevent the back flow, which occurs when the drains discharge from a house at a low level into the sea or any tidal river. Fig. 1 is a section of one, which explains itself, and although there are others in the market, they are mostly the same in principle. For drains discharging into ordinary sewers these tide-valves are of no use for keeping back sewer-air from entering the house-drains. This is a good description for its purpose, as it will be seen that sewage cannot very well get on the top of the ball, so as to clog it and prevent it from fitting over the end of the incoming pipe.

It has been argued that all house-drains should enter the sewer at a level just above the surface of the water in the

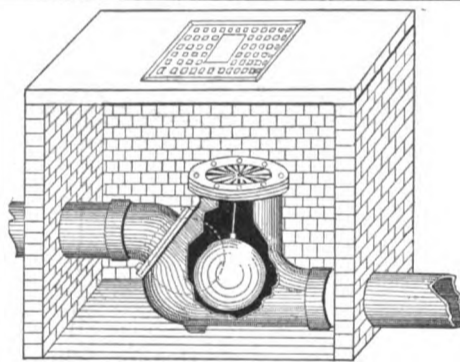


FIG. 1.

sewer, so that when an extraordinary quantity of water enters the sewers the ends of the drains are covered; so that it does not matter how much the air is compressed in the sewers, it cannot force its way back into the houses. But this is not a good plan by any means, as in rainy weather the ends of the pipes would *always* be covered, and so render the drain, if it is trapped, "air-bound," and thus prevent the free flow of sewage from the house, with the result that discharges from upper parts of a building would escape through the lower fittings, even if the water in the sewer was low enough to allow them to run away if the connection had been made at a higher level. Again, if the connection is made at a low level, rats could much more easily gain access to the house-drains, and although most people object to these animals in a house, still it must be admitted that they sometimes act as scavengers, and no doubt get rid of a great deal of garbage in the sewers which would otherwise putrefy and give off foul emanations. I find in practice, that when making an examination of a private house, and there are signs of rats, on making further search, defects in the drains are generally found. It may be noted that when the drains are of iron or vitrified stone-ware, it is very rarely that these pests are discovered, although in hotels and such like public buildings, one or two will often get under the floors and propagate very rapidly, but with pains they can generally be starved out or poisoned; but this way of getting rid of them is objectionable, as the dead bodies lay about and putrefy, and if in a damp situation the smells arising from them are noticed for several weeks afterward.

Watts & Co., of Bristol, make a very good machine called an "Asphyxiator," which is of great use to plumbers, both for testing overground-pipes for defects, and also for exterminating vermin, as well as for distributing

an aerial disinfectant. This machine will be referred to again at a future time, as I find it of great help when making examinations for smells.

House-drains made of brick are now becoming things of the past in London, but in some parts of the country builders stick to them and believe in no other description. Bad as this description of drain is found to be, there are others worse. I was sent into the country last week to look for odors in a parsonage, and found beneath the wine and beer cellars drains large enough for a man to crawl through, and the sides and arch built of random rubble—that is, of irregular-shaped stones. The stones in the bottom had been worked to a face—rough, it is true—so much so that solid sewage lay all over the bottom, and liquids glided over the top of the solids in a zigzag course made by themselves. Two drinking-water wells were within fifty feet, and an analysis of the water proved that they were both unfit for domestic purposes. No doubt country experiences would be interesting, but the object of this paper was London work, so we will return and speak of drains. Hitherto this has not been literally plumber's work, but the success of his work depends more on the drains than a great many think, for only a part of the system being made perfect is of no use.

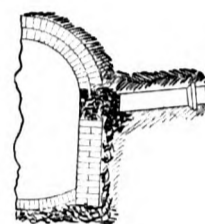


FIG. 2.

Most of the drain-pipes used in London and other large towns are what are commonly called glazed socket-pipes. They are made from 2-inch internal diameter up to two feet, and are two feet long in all sizes, but I believe in Scotland they are made as long as three feet. There are several kinds of these pipes, but for the present only two will be mentioned, namely, the *lead-glazed* pipes, which are made of inferior clay and which will not stand the necessary heat for burning them properly, and the *salt-glazed*, which must be made of a clay or composition of clay and other ingredients which will stand a very high temperature, so that the sodium of common salt will combine with the silicate of the clay and the other necessary constituents, to convert the surface of the article into a coating of glass which will withstand the action of sewage-gases. Lead-glazed pipes are reported as not being capable of resisting this action. With the laying of the branch drain from the house to the sewer, the sanitarian's trouble commences.

A few weeks ago the writer was in a sewer near Hyde Park, in London, having, with a little persuasion, etc., gotten permission to go with the men to see that a drain was made good in a proper way. While passing along, a mysterious voice was heard to say in a hoarse whisper: "Ssh, there goes the sewer rats!" On looking at the side from whence the noise came, it was seen that a disreputable tradesman was laying a new drain from a house, and so as to save a small fee he was making his own connection, and, in addition, he was scamping his work by burrowing under the roadway, instead of opening out in a proper manner. Fig. 3 represents a section of how this man was doing his work. It appeared as if he had taken out an old brick drain and in knocking out the connection with the sewer by



FIG. 3.

means of a crowbar had made a larger hole than was necessary, and then had simply pushed his new pipe to within about six inches of the sewer. This was done in such a way that a great deal of liquids would not reach the sewer at all. He had then pushed a lot of broken bricks around the opening left, some of which had fallen through so that solid sewage would cling around these pieces. The "shoreman" (sewerman) said this was very commonly done, and

offered to show me more, but I began to long for a little fresh air and so declined his kind offer.

Another experience in the west end of London was where a new drain had been laid in a house, and although all fees had been paid, the connection with the sewer had not been made good in a proper manner. The sewerman's excuse was that he expected to have two or three more to do in a few days and was going to do them all at the same time. But before this was done a violent storm took place, and the sewer was so full that water ran out, and following the excavation made to lay in the pipes, found its way into the basement to a depth of about fourteen inches, and which had to be carried out in pails. These drains had been laid for about eight or nine days and had been plugged at the outlet and charged with water and proved to be perfectly water-tight, and this was proof that the sewage was not escaping out of the pipes when the storm took place, but found its way beneath, or by the side of them, and so followed the trench, the earth in which had not sufficient cohesion to resist the hydraulic pressure brought to bear. This is one reason why all pipes laid under the above circumstances should be enveloped in concrete. There are very few men who lay drains properly, and who, as a rule, have any system. Although the writer is not a bricklayer, it frequently occurs that when he is intrusted to carry out any work of this description, he has had such difficulty in getting men to understand the importance of laying drains properly, that in despair he has often done them himself. There are plenty of men who are good at this kind of work, but it unfortunately happens that they cannot always be found, having got work elsewhere during a slack time. The best system to commence with is to dig the trench as neatly as possible, taking care not to loosen the sides more than can be helped, and to dig the bottom even, also to remove all loose earth from the bottom. After carefully leveling from end to end of the trench, to see what amount of fall can be had, drive in wooden stakes at intervals of about eight or ten feet, and projecting above the bottom four to six inches, as intended for the thickness of concrete, with which cover the bottom of the trench to the height of the stakes; make the concrete slightly hollow for the pipes to lay in, and have spaces at each socket, so that the man can get his hand and tool beneath to trowel up the face of the cement-joint. This way of preparing for laying the pipes is very important, and for want of it serious results frequently occur. One of these is, that very often a settlement takes place in the earth beneath the pipes. If this is soft earth or a sandy, or loose, gravelly soil, sooner or later it is sure to give way, and if there should be water in the soil the circumstances are worse; or if one of the joints in the drain should leak, the water trickling through causes the sand or earth to run and leave a hollow.

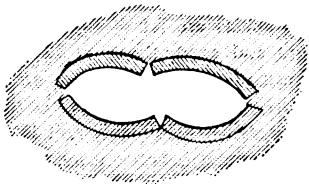


FIG. 4.

The writer had to go to a banker's house at Lunningdale some few years ago to find the cause of stoppage in a drain. He got a bricklayer to take up a stone in the courtyard, after which he began digging to find the drain. The laborer struck his pick into the earth, and then fell forward on his face, with his legs buried in debris, to the alarm and astonishment of those present. Fig. 3 is a sketch of what happened. It appeared that a leaky joint had caused the sandy soil to run, and at last the drain broke in such a manner that all the sewage from the house ran into the hole and made matters worse. This hole was about six feet in diameter and 5 feet 6 inches in depth, measured from the top of the loose stuff after the man (more alarmed than hurt) had been extricated. Such was the nature of the soil that no doubt this hole would have become so large that the whole of the paving in the yard would have eventually fallen in, and it is just possible that the wall of the house would have fallen at some future date. Some think if drains are laid on rocky earth no concrete is wanted. My experience is otherwise, because if the bottom of the trench is too hard it will cause the pipes to break as if by crushing; and even in a case of a hard, gravelly bottom I have taken out drain-pipes that have been crushed as shown in section, Fig. 4.

This was at a house in Kensington, and the drain was about 7 feet deep. On looking at the fracture it was seen

that the pipes were ordinary vitrified stoneware of very fair quality. We all know the strength of an arch, and the resistance a cylinder will present against a crushing force *if it is distributed over the entire surface*, but if applied to particular parts the resistance is soon overcome and the whole collapses. This more readily takes place in drains in towns where heavy traffic in the streets causes the earth to vibrate, and shakes the particles into closer contact, so that anything rigid must either sink with it or break. This is more especially the case in new districts, and no doubt there are hundreds of cases of fractured drain-pipes from this cause that are not discovered until something leads to a search being made. We have only to take note of how often a water or gas-main requires repairs, especially in newly made roads, to understand the importance of protecting a frail piece of stoneware, which, in most cases, is no stronger than ordinary crockeryware.

(TO BE CONTINUED.)

THE PLUMBERS' AND DEALERS' TRADE-PROTECTION CONTROVERSY.

WE stated in our last issue that some check should be placed on men who, in their official capacity as officers of the local and national plumbers' associations, were issuing printed matter that subjected plumbers of the United States to ridicule. We stated that these men, judging from their productions, were incapable of realizing how the rest of mankind construed the language they employed in these various printed documents. We were and are quite aware that this was a severe reflection on these committees, yet we believe the plumbers of this country are misrepresented by these productions, and we believe we are justified in our strictures. We now quote a few paragraphs as evidence of the justice of our criticism.

In an address from the Executive Committee, without date, but recently issued, signed by Andrew Young, J. J. Wade, James Allison, W. H. Graham, Jeremiah Sheehan, John Sanders, Martin Moylan, Alexander W. Murray, and Thomas Havey, we find the following language employed:

"What have we to fear from the wholesale and manufacturing interests? It is they who will tremble, if they persist in their outrageous course of taking our money, depending on our support for their success."

THE SANITARY ENGINEER would reply: You have nothing to fear from these dealers and manufacturers, but you and those who sustain you risk losing the patronage of those who do not try to buy materials at wholesale rates and who are always willing to pay a good plumber a fair profit for the work done and materials used. You should fear the loss of these men's respect for your good sense when they read such silly appeals.

The following also appears:

"You are called to inspect a house in which the plumbing-work is out of order. After you have told your patron what is wanted, you are selected to do the work. When you render him your bill for material and service he refuses to pay for the material as rendered by you, replying that he can get it from the manufacturers as low as you are paying yourself. And he tells you no untruth, for the customer who wants \$10 worth of plumbing goods gets them at the same figure as you who buy from \$25,000 to \$100,000 worth a year."

The readers of THE SANITARY ENGINEER know that this statement is misleading and practically untrue. In the first place, the men who employ plumbers, except in rare instances, do not expect or ask to have either work done or materials furnished without paying a profit. A few men will always try, by misrepresentation or any other means, to get goods and prevent any one from making a profit on them. They are, however, a small minority of those who employ plumbers, and attempts to secure agreements that will insure a profit from transactions with such men are useless. Such men's trade is undesirable, and in advocating measures to enable plumbers to make a profit out of dealings with a man of this class, you should not disgust your desirable patrons by insinuating that they all expect work and materials at cost and are unwilling to live and let live, because this is not true.

You should advise a plumber to refuse to put up any materials that he is not allowed a fair profit on, and to abstain so far as he possibly can from dealing with any firm who sell goods at wholesale rates to the present or prospective customers of a plumber.

We do not believe the statement that a consumer can buy \$10 worth of plumbing materials as cheaply as a plumber who buys from \$25,000 to \$100,000 worth a year. If that has ever occurred in the past we have not the

slightest doubt that some of the parties who have made haste to indorse resolutions, write letters pleading the baby-act and their willingness to assent to impracticable propositions, are the ones who may have thus conducted their business.

We also extract the following as a specimen of the mischievous and foolish raising of an issue that, no matter how plausibly it is put, is bound to be construed as a threat against journeymen. Indeed, we can now see the possible inspiration of the call that we printed last week, which resulted in the holding of a journeymen's national convention, delegates from all parts of the country being present. It is useless to disguise the fact that unless the journeymen are guided by wiser men than those who have been running the masters' associations on the rocks, there is trouble in store for the plumbing trade in cities where societies exist. We print the whole reference:

"With perfect organization in every State, county, and township, we hold all these evils in check, even the most annoying and hardest to deal with—the unfaithful and wandering journeyman, who has no reputation or name to become identified, but simply good workmanship for a passport, which carries him far and safe in his calling, and on the strength of which he receives a hearty welcome from us.

"But to carry out our system of protection to our trade he becomes an important factor in forming that link in the chain which destroys its strength. He it is who not only does harm to us, but immeasurably more harm to the industrious class of journeymen on whom we depend; on whom we rely to do the bulk of our important work; who labor with us and for us, early and late, year after year; who enjoy our confidence, and which we have never found misplaced. It is the unreliable journeyman who, in times of great activity, becomes valuable to the consumer who has purchased goods which no reliable plumber will place in his building. He it is who offers to do the work for the builder at a small advance per day, violating the confidence of his employer; and then, after the completion of the work so gotten underhandedly, goes to other parts, playing the same game.

"Against this class of journeymen we need protection, and this can only be effected by organizing in every State, county, and township, and by reporting such cases to the proper officer at the head in the State, and he to the national organization, so a complete record will be on file of all unworthy of our trust."

They seem to forget that the journeyman of to-day expects to be, and will be, the master of the future. If a journeyman cannot get employment in a shop, is he to turn laborer, or must he become a master plumber in order to eke out an existence until he secures a steady job at regular wages, which any good man prefers to precarious work from the class of consumers who want to avoid paying any profits? Will master plumbers be any better off by offering a premium to men to start in business, for is it not a fact that more master plumbers are made in dull seasons, when bosses have no work for journeymen, than at other times? Necessity has frequently created a master plumber out of a journeyman unable to get regular work. Would it not be better to let the journeymen alone in this matter, and take the position that a wholesale firm, which pretended to protect its plumbing customers when it sold goods to a consumer who was not justified in waiving all discounts at the suggestion or by the consent of a floating journeyman? Though if the journeyman took a shop, obtained his regular license from the proper authorities, thus becoming a master plumber regularly in business, he could, if he saw fit to, take percentage work on any terms he chose, and the wholesale dealer is justified in selling the goods, either to him or to his customer, as they may agree. The little jobbing and cheap work a floating journeyman can do is not of enough consequence to call for consideration or attempts to control it on the part of masters' associations, and such efforts will fail of accomplishing anything beyond causing apprehension among a class that should not be thus aroused.

We select one more paragraph which has a glimmer of sense in it, though the language employed probably misrepresents the meaning intended by its framers. It is the suggestion that—

"We deal only with those firms who protect us by their dealings from annoyances, trouble, and litigation."

They probably meant to suggest that plumbers confine their dealings to those firms who sold to the trade cheaper than to the customers of the trade. That is good advice, and that is all that can be done. Acting in accordance therewith, however, sometimes needs a little sacrifice on the part of certain men, and it is this sacrifice they have too seldom been willing to make. When plumbers will make sacrifices to deal with firms who do business as wholesale business should be done, then such wholesale firms will be more numerous. That is the only remedy, and it must not

be forgotten. The absence of "annoyances, trouble, and litigation," is a condition, however, never realized by mortals in this world.

The Baltimore association sends out a circular signed in its behalf by the following officers: W. H. Rothrock, D. B. Foster, W. D. L. Peacock, Peter Kreis, and George Knipp. The following appears as being a resolution passed at the last meeting:

"That we will not purchase, use, or recommend any article made or sold by any manufacturer or dealer in plumbing material who has signed against the resolutions passed by the National Convention of Master Plumbers, held in Baltimore City, June, 1884; that we shall patronize none but those houses that will do us the justice of signing the resolutions of the Baltimore Convention, as presented in the conference at New York by President Andrew Young, Esq.

This decision is respectfully commended to the people of Baltimore who are willing to pay a plumber a profit on the work he does and the material he uses, they no doubt assuming that when they employ a man and ask his opinion on a matter he will tell the truth. It now appears that the merits of an apparatus for any particular duty are no to be conceded by the men who voted for this resolution—only those articles made by firms who sign a certain proposition are to be commended. It will be noticed that a signature is all that is required; performance is evidently not expected; in fact it is well not to expect it, since disappointment will thus be avoided.

In the latter part of September the following printed document, signed by James W. Birkett, president, and D. T. Gateson, secretary, in behalf of the Brooklyn Master Plumbers' Association, was issued, from which the following extracts are taken:

"At a meeting held September 12, 1884, it was unanimously adopted that the agreement signed by the manufacturers and dealers of plumbing supplies should go into effect October 1, 1884, of which the following is a copy—viz.:

1st.—That the manufacturers and dealers in plumbing materials shall not sell to any person other than licensed plumbers, they presenting a printed certificate signed by the president and secretary of the association in their respective locality. The said certificate would be a guarantee that the person presenting such certificate is a licensed plumber and is regularly engaged in and carrying on the plumbing business. New certificates to be issued every three months.

2d.—That no manufacturer or dealer shall figure on specifications or plans for any person whether engaged in the plumbing business or not.

3d.—That no patentee, manufacturer or dealer of patented articles to be used in the plumbing business, shall sell to others than licensed plumbers, as stipulated in section 1st.

4th.—That any plumber who waives the discount in favor of his customer, or allows it, shall be dealt with as one not entitled to the regular trade discount, and his certificate be revoked, and the same to stand revoked until he is reinstated and receives his certificate from the association in his locality.

5th.—That manufacturers and dealers shall not under any consideration furnish repairs or men to do the same.

6th.—That manufacturers and dealers should not become sureties for the fulfillment of any plumbing contract.

7th.—That where manufacturers and dealers require securities from persons engaged in the plumbing business, such security shall not be accepted from any interested party for whom the work is to be done, either owner or contractor.

8th.—That agents of manufacturers and dealers shall be prohibited from selling plumbing goods to any person other than as stipulated in section 1st.

9th.—That the manufacturers and dealers will pledge themselves not to sell or deal with any person or persons other than those as stipulated in section 1st.

"For the better protection and advancement of the plumbing business, and for your own protection, you are earnestly requested to call at the office of the president of the association, 68 Myrtle Avenue, to receive your certificate, on and after September 29, 1884. No licensed plumber who has not complied with the rules of the Department of City Works will be entitled to a certificate. The following manufacturers and dealers have signed the agreement: Henry McShane & Co., J. Connolly, L. Brandeis & Son, James Bulger, Jr., Renton Bros., Williamsburg Lead-Pipe Works, The Bradley White-Lead Co., Jamer, Jacobs & Co."

The agreement referred to and presented in this document is essentially the outrageous one printed on page 356, issue of September 11, and the one the New York manufacturers repudiated, likewise the sensible plumbers in all parts of the United States. These Brooklyn men evidently have no idea of dodging; they insisted on these demands at the meeting with the manufacturers, and apparently

propose to stick. Fancy the condition of mind of a man that will respond to this precious invitation, which is, in effect, *come up and get our permission to do business*. The firms who have assented to this proposition must entertain an exalted opinion of the intelligence of Brooklyn plumbers, though it is now in order for them to claim that they did not intend to assent to this, but some other proposition. Indeed, some of the names published appear signed to the manufacturers' letter repudiating this practically identical so-called agreement.

We commend the foregoing to those intelligent master plumbers in the various cities where societies exist, who, from a desire to show their sympathy with their local association that might be a benefit to the craft in many ways, have allowed their names to appear on its rolls. These men have contributed to its funds, though probably seldom attending its meetings, and yet they are not free of responsibility for its actions. Those men who have had, still enjoy, and hope to retain the confidence and respect of their desirable patrons, should realize that the time has come when they must either prevent their societies from persisting in their foolish and ridiculous measures, or they must resign and thus rid themselves of responsibility for these society actions. Their patrons may be satisfied for a time with apologies and explanations that this and that published proposition was a mistake, but the continual repetition of the blunders destroys the force of such explanations, and disturbs confidence in the sincerity of the men who are so often compelled to apologize for their colleagues.

In this connection we commend to the various local associations the prudent action of the Boston Master Plumbers' Association, which has thus far abstained from issuing a line of printed matter, and thus avoided the possibility of placing the craft in a false position before the community.

THE FIFTH INTERNATIONAL CONGRESS OF HYGIENE.

No. III.

(Concluded from page 411.)

THERE was, of course, the customary debate in favor of cremation, an able lecture on water-supply, and proposals for all manner of international societies, and schemes of international legislation against epidemics. At the suggestion of Dr. Ruysch a committee was formed to denounce the dangers arising from the rag trade. Dr. Ruysch had shown, in a masterly manner, the number of epidemics which were traced to rags, and Dr. Sweeting, of the Fulham Hospital, London, explained that English law was severe on this question, and that all rags recently imported from Marseilles had been burnt on reaching English ports. Much was said on the adulteration of food by Dr. Brouardel, who showed that when an industry was proved injurious in one country it was at once established in another country, where many years must elapse before the law could be brought to bear against it. Consequently, he urged the necessity of assimilating, as far as possible, the law in each country, so that emigration should no longer shield these nefarious and dangerous industries. Dr. Vallin, on his side, urged that the sale of milk and meat should be more closely watched, as cattle suffering from tuberculosis were too often consumed as food. It was also decided to recommend rigorous disinfection in cases of advanced consumption. The sputa in phthisis was proved to be highly infectious, and should be discharged in spittoons containing a powerful liquid disinfectant. Handkerchiefs were dangerous, for with them furniture and clothing were contaminated, and co-habitation was also pronounced to be more than injudicious.

Much was said about school hygiene. Dr. Cohn, of Breslau, exhibited a remarkable instrument for estimating precisely the amount of light on any given point, while M. Emile Trélat advocated the admission of fresh air direct, without previous warming. This matter will be discussed fully at the next congress, as it was felt that M. Trélat's proposition, however correct theoretically, was practically impossible. In the Demographical section an attempt was made to establish a comparison between infant mortality and the price of food, which showed, so far as Holland is concerned, the mortality did not increase when food was scarce. On the other hand, it was contended that it was not the price of food, but the rate of wages which governed the case, and on this latter point sufficient information was not forthcoming to admit of any decision. An

appeal was therefore made to demographs of all countries to collect information on these phases of the question. An able paper was read advocating cottage homes for pauper children, by Mrs. E. Bovell-Sturge, Doctor in Medicine of the Paris University, which caused much sensation, both by reason of the pathetic manner in which the speech was delivered and the exceptional interest awakened by the presence on the platform of a lady who was at once a doctor and an orator. Mrs. Sturge, was not, however, the only lady doctor present. There was, also, Madame Coronel, the first lady who has taken her degree as doctor and established a practice in Holland.

Dr. Corfield, Medical Officer of Health of St. George's, Hanover Square, London, delivered a learned lecture on "Sanitation, the Enemy of Disease," in which he described how advanced the ancient Egyptians were in this science; and M. Marey, of Paris, explained how he had studied the movements of the human body, by means of instantaneous photographs and boards that recorded at each instant the varying pressure of the foot. This enabled him to prove that if we took more than seventy-five steps per minute in walking, we lost instead of gained in power and rapidity.

Of all these numerous subjects that which will be of special practical interest to Americans is the paper read by Dr. Schwappach, of Giessen, on the "Climatic Effects of Destroying Forests." The following were the conclusions of this report, and they were greeted with general approval by the Congress: Dr. Schwappach thought that the extreme temperature of lands which had been formerly covered with woods became more elevated both in the atmosphere and the soil. The average dampness of the atmosphere was reduced, but that of the ground depended upon the nature of the soil. The number of clouds does not seem to be much affected by the destruction of forests, but the proportion that reach the earth in the form of mist or rain is notably augmented. The lands in the neighboring localities are no longer protected against dry winds nor sheltered against the violence of the winds. If the land is flat the difference becomes all the more perceptible. The disastrous consequences that result are far more serious on large continents than in maritime districts or islands. After the destruction of forests, the water will remain in the soil, which was formerly extracted by the vegetation. Marshland is thus easily formed, and its effects must be injurious to health. The destruction of forests by accelerating the evaporation of surface-water has an unfavorable influence on the abundance and preservation of water-springs. The surface-water, no longer checked in its course by the trunks and roots of the trees, flows off more rapidly, and this, combined with the prompt evaporation of small rivulets and puddles, soon reduces the volume and depth of the neighboring rivers. In mountainous districts, the destruction of forests produces torrents, land-slips, and avalanches, and these evil effects are felt at a great distance. When the soil is light and sandy the removal of trees is one of the principal causes of the formation of quicksands. This danger increases with the violence of the wind, and especially near the sea-coast. Therefore, it is the duty of the State to encourage, by every means, the plantation of woods, especially on the downs by the sea-shore.

These conclusions may be looked upon somewhat in the light of platitudes by those who have studied the question, but to the majority of the members of the congress, who are inhabitants of crowded cities in thickly-populated countries, the points raised were comparatively new.

Such, in a few words, were some of the leading subjects discussed. But, apart from these debates, there were dinners, concerts, and receptions nearly every night. Toasts were proposed and carried with great enthusiasm, and at Count Van Bylandt's garden party, a splendid display of fire-works was offered to the members of the congress. This reception was held in a noble forest, all the trees being illuminated, and the fire-works were let off on the borders of a small lake. Altogether, the Dutch maintained their high reputation for hospitality, notwithstanding the national mourning for the loss of the Crown Prince.

The next congress, in response to an invitation from the municipality, will meet at Vienna, where the members look forward to breaking new ground. It is to be hoped that in this they will be assisted more efficiently by Americans and Englishmen. Undoubtedly England and America stand first among the nations of the world with respect to practical hygiene. No where is good drainage better understood and more strictly applied than in England and America. It is therefore essential that English-speaking sanitarians should take a more prominent part in spreading sound notions on public hygiene.

GAS FROM SAWDUST.

THE use of sawdust for the manufacture of illuminating or heating gas is a matter of interest, and one of some practical importance, especially in some of our Western towns where coal is expensive and sawdust is thrown away.

The following particulars regarding the Walker process for manufacturing gas from sawdust are given by the *Journal of Gas-Lighting*:

Sawdust from ordinary pine wood, carbonized at a temperature of 1,500° Fah., yields from 11,000 to 14,000 cubic feet of gas per 2,000 pounds of dry material. The gas has an illuminating-power of 15 candles, and a specific gravity of .590 to .620. The following is given as the composition of the purified gas:

Olefiant-gas.....	7.46
Hydrogen.....	33.12
Marsh-gas.....	26.89
Carbonic-oxide.....	32.53
	100.00

More resinous woods give a gas of higher candle-power.

The heating-power of sawdust-gas is fully equal to that of the best coal-gas, and it is a permanent gas at nearly all temperatures.

According to the "Walker" process, in order that the sawdust may pass freely through the hoppers and the connecting-pipes to the retorts, and be handled by the conveyers and elevators without clogging or interrupting the process, it is necessary to remove all chips or fragments of wood or bark contained in the sawdust as it is delivered from the saw-mill, as well as thoroughly to dry it. The screen used is cylindrical in shape, and has meshes about $\frac{1}{4}$ inch in diameter. The most suitable drier is that in common use for drying grain, and consists of a series of flat, circular steam-jacket tables, arranged horizontally, about 15 inches apart, supported at their edges by lugs arranged on a perpendicular iron or wooden framework. After leaving the drier the sawdust is passed by means of a short conveyer to the boot of an elevator, consisting of the usual belt and buckets, by means of which it is delivered to a conveyer, which in turn delivers it to the feed-hopper of the retorts.

The only labor required to perform the operation of screening, drying, and conveying the sawdust to the hopper of the retorts is that of shoveling the wet sawdust into the opening in the platform over the screen. The cost of drying sawdust will depend upon the percentage of water which it contains. Sawdust made from logs taken out of the water at the mill usually contains 50 per cent. of water; and the fuel necessary to remove this amount of water and to produce 2,000 pounds of dry sawdust is 333 pounds of soft wood. This, being saw-mill waste, should not, in any event, cost more than \$1 per 2,000 pounds at the boiler-furnace; thus making the expense of fuel required to generate the steam necessary to produce 2,000 pounds of dry sawdust 16.66 cents.

The carbonization of the sawdust is effected in cylindrical or A-shaped retorts of cast-iron or fire-clay, 9 feet 6 inches in length by 12 inches internal diameter, arranged horizontally in a furnace in benches of one or more retorts, preferably five. Each retort connects at its front end with the lower end of an upright conduit, having at its upper portion a feed-hopper. The sawdust is automatically and uniformly delivered into this by a conveyer or feeder, consisting of a worm or screw, rotating in a casing; the sawdust being supplied to the conveyer by means of the elevator connected with the steam sawdust-drier already referred to. The feed-hopper and conduit contains a vertical shaft provided with radial arms arranged in the hopper, and with a worm or screw arranged in the conduit. The shaft has a bevel-gear wheel at its upper end, engaging a pinion on a horizontal rotating shaft, whereby the vertical shaft is rotated so that the material in the hopper is thoroughly loosened and delivered to the conveying-worm or screw extending horizontally through the retort. The front end of the shaft of this screw extends through a stuffing-box on the retort; and it has a worm-wheel engaging in gear on a horizontal rotating shaft, so that the sawdust is caused to traverse the heated retort from front to rear. The rear end of the retort is provided with a pendent tube connecting with a closed charcoal main or case arranged at right angles to the retort at the rear of the furnace brick-work. This main contains a revolving conveyer or worm, by which the material passing through the pendent tube is conducted through the charcoal main to any given point, and discharged through an opening at the end of the main. The rear end of the retort is also provided with a vertical pipe or tube connected at its upper portion with a vapor-

receiving main arranged at right angles to the retorts at the rear upper portion of the furnace brick-work, and connects at one end by a pipe with a condenser. The condenser is composed of a series of copper tubes connected by return-bends arranged horizontally in a body of water contained in a suitable tank, and the outlet end of the lower or end-pipe is provided with a bent or S-shaped trap-pipe, connecting by a vertical tube with a gas-receiving chamber or conduit for taking away the gas for purifying and storing. The retorts are thus uniformly and continuously fed with the sawdust without handling the material; and in its forced travel through the retort the sawdust is carbonized and charcoal remains.

The floor space occupied by one bench of five retorts and its appurtenances is 35'x17'6", and for two benches, of five retorts each, a space 35'x35' is required.

The building should be of brick or stone, and should have an iron roof rising to a peak in the centre, and be thoroughly ventilated. The buildings and all the apparatus for the purification and storage of the gas and the general arrangements should conform as closely as possible to the best modern coal-gas works. A plant for the manufacture of coal-gas can be easily adapted to the manufacture of sawdust-gas; the most important changes necessary being those connected with the retorts and brick-work.

The power required for two benches of five retorts each, producing 300,000 cubic feet of gas per week, is that of five horses, which serves for all purposes connected with the production of the gas, including the power needed for screening and drying the sawdust. This power can be most economically furnished by means of a gas-engine.

The following is an estimate of the cost of producing 300,000 cubic feet of gas from sawdust by the "Walker" process, running two benches of five retorts each, for five days:

EXPENDITURES.

Drying sawdust, 30 tons, at 50 cents.....	\$15 00
Fuel, 10 cords of soft wood, at \$2.....	20 00
Labor, two men and two boys, five days.....	33 00
Wear and tear.....	20 00
Lime for purification of gas.....	18 00
	\$106 00

RECEIPTS.

6 tons charcoal, at \$2.....	\$12 00
10 barrels tar, at \$2.....	20 00
Pyroligneous acid, 1,500 gallons, at 3 cents.....	45 00
30 gallons alcohol, at 80 cents.....	24 00
	101 00

Cost of 300,000 cubic feet of gas at 1.66c. per 1,000... 5 00

The cost of 300,000 cubic feet of gas, without allowing any credit for residual products, thus works out to 35.33c. per 1,000 cubic feet.

TEST OF AN EARTHEN-PIPE HOUSE-DRAIN IN BROOKLYN.

SOME time since Commissioner Raymond, of the Board of Health of Brooklyn, gave conditional permission to the advocates of earthenware house-drains to lay a house-drain on the premises at the corner of Underhill and Atlantic Avenues, for the purpose of proving if it were possible to lay an earthen drain that would stand a water test.

On Monday, the 29th of September, a public test was made in the presence of Mr. James Power, the Chief Inspector, and Messrs. William J. Roche and Samuel Bower, Assistant Inspectors of Plumbing, and members of the press, and others who were interested.

The pipe used was one and a quarter inches thick, and six inches inside diameter, with specially designed hubs and spigot ends. With a head of water 6'x10' above the lowest part of the pipes the inspectors reported seven joints as sweating and one as leaking, the total number of joints being sixty. The compound used to make the joints was equal parts of cement, sand, and iron-filings, with a little sal-ammoniac.

Health Commissioner Raymond very properly realizes that no regulation of his department should embarrass any special kind of trade unless the public safety required it. He has therefore, and very properly too, allowed the advocates of the use of earthen pipe for house-drains in Brooklyn several opportunities to show how perfect a drain they can construct with it, even letting them use a kind of pipe not usually sold for such purposes. We would suggest, however, if the Commissioner thinks he can secure such work and pipe as was put in this house in all the houses under his jurisdiction where it is desired to use earthen pipe, that he might be justified in giving the experiment a six months' trial, with a proviso that at the end of that time each drain of that character be so exposed that it can be easily examined and tested. If he thinks he cannot guarantee the people of Brooklyn such work and pipe as was put into this house, we fail to see how he can conscientiously modify his rules in the light of all past experience.

Correspondence.

DOMESTIC BOILERS.

MEDICAL OFFICER OF HEALTH,
TOWN HALL,
ABERDEEN, September 10, 1884.

To the Editor of THE SANITARY ENGINEER:

I HAVE been asked the following questions, but do not feel quite competent to answer them. Can you oblige me?

1. How long will a properly galvanized-iron (hot water) cistern last? Why does this kind of cistern rust inside and the rust appear outside?

2. Is there any objection to a copper cistern tinned inside (for hot water)?

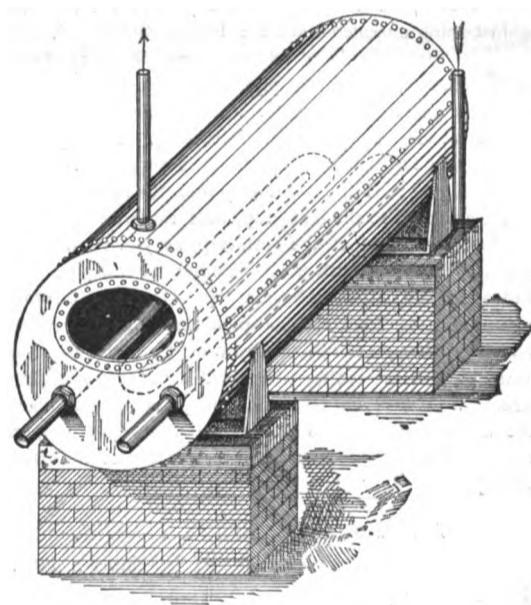
3. Can you recommend any other kind of cistern for a water-heating system?

Yours sincerely,
W. I. SIMPSON.

[1. Our galvanized-iron domestic or range boilers, as we call them in this country, have been in use about fifteen years. They do not rust on the inside sufficient to affect the color of the water, if in constant use, because they are closed from the atmosphere and their outside appearance is always the same. They have come into general use because they are cheaper than copper tinned inside of equal strength.

2. If the price was not a consideration, we should prefer copper tinned inside. As we understand the practice in Great Britain, the hot-water tank or boiler, as we call it, is placed alongside or near the cold tank, and is not closed to the air. In such a case we should say that the galvanized-iron would soon rust and discolor the water.

3. In the large apartment-houses of this city tanks of $\frac{1}{4}$ -inch or $\frac{1}{8}$ -inch boiler-iron, from three to four feet in diameter by from six to ten feet in length, cylindrical in shape, with a manhole in one head, are used for warming water, and the warming agent being generally the exhaust steam from the elevator engines, or pump for the hydraulic elevators,



the thermal value of which is used this way. The accompanying sketch shows how these tanks appear. Should the exhaust-pipe be three inches in diameter it is taken to one end of the tank and carried back and forth within it for a number of times—generally four—forming a coil, thence passes to the roof of the building, the condensed water being separated at the lowest corner before it ascends. These tanks are under pressure at all times. Water from a house-supply tank at the roof is brought down into them, entering at the bottom and leaving again at the top, warmed, and of course rising within the building to an equal height with the house-tank. The warm supply from these tanks to the fixtures is sometimes fitted with a circulation-pipe for the purpose of keeping warm water constantly near the fixture. This pipe returns parallel to the rising pipe and enters the tank at the bottom. A good way is to carry a small pipe (three-eighths of an inch) from the head of these circulating lines to a height three or four feet above the house-tank, to act as an air-escape, and again to facilitate drawing the water from the line should it be shut off for repairs, by allowing the air to draw in at the top. On pages 145 and 193 of the current volume of THE SANITARY ENGINEER may be seen representations of domestic boilers and their connections.]

CALCULATING SIZE OF BOILER.

WINNIPEG, September 25, 1884.

To the Editor of THE SANITARY ENGINEER :

KINDLY give us a rule for computing the size of boiler required for heating a building of about 90,000 square feet air-space. How many feet of pipe do you allow to 100 feet of air-space? How many feet of boiler-surface to 100 feet of radiating-surface of pipe? Yours truly,
AMERICAN PLUMBING CO.

[In your cold country an average of *one* square foot of direct radiator to each 50 cubic feet of space warmed will not be too great. This will call for 1,800 square feet of surface, which is capable of condensing from 600 to 800 pounds of water per hour. To evaporate 800 pounds of water it will require about 400 square feet of horizontal-boiler surface.

These figures, of course, are only approximations, and they lean to superabundance; but for large buildings, or buildings with systematic ventilation, our advice is always to consult a specialist, so as to avoid unnecessary expense and at the same time secure a properly proportioned apparatus.]

VENTING A TRAP.

BALTIMORE, MD., September 25, 1884.

To the Editor of THE SANITARY ENGINEER :

I FIND in the house of one my clients that the vent-pipe from a bath-tub trap at the upper floor is carried horizontally three feet under the floor and through the side of the house, terminating in a short bend. This pipe I claim should be carried above the roof and should be run inside the house. The inclosed sketch will show the relative positions also of the wash-basin to the bath-tub, and how they are piped and trapped. The trap of the bath is ventilated, as you will see, but the trap of the basin is not. Do you not think the bath will unseat the basin-trap? I think it will, and it is going to cost some little to properly vent this trap and make other changes. What had I better do? If you will answer these questions at an early day so that I can have the matter fairly well done, you will oblige,
A YOUNG ARCHITECT.

[The vent, as shown, will not protect the basin-trap against being unsealed when the bath is discharged. The vent-pipe should be placed, as you suggest, inside the house. In this climate, with a vent-pipe terminating out-of-doors, and only three feet from the water in a trap, as in this case, there must be likelihood of freezing. The open end might also be offensive if any windows were near. Before attempting to vent the basin trap into the same vent-pipe that is attached to the bath-trap, take the waste-pipe from the basin-trap out of the bath-trap, as you show it, and connect it into the bath-waste or adjacent soil-pipe below all traps; otherwise you have a "pass-by," establishing a communication from the soil-pipe through the bath-trap vent back through the basin-trap vent, through basin-waste to the plug of the bath, when it will enter the room unobstructed. If it is not convenient or practicable to change the basin-waste and to run these vent-pipes properly, the next best thing is to use a deep-seal trap of the Bower class.]

ARTIFICIAL GRANITE PAVING.

NEW YORK, September 1, 1884.

To the Editor of THE SANITARY ENGINEER :

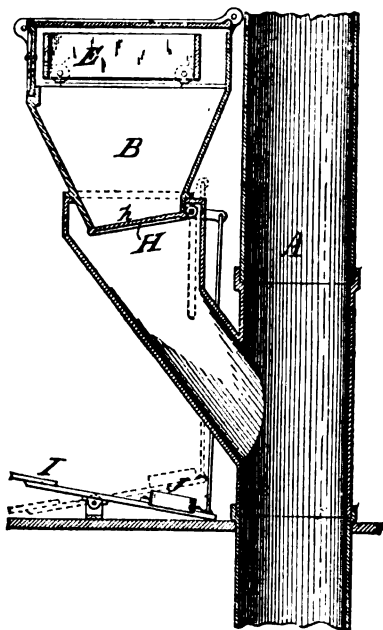
WILL you be kind enough to inform us, through the columns of your journal, what is "artificial granite paving?" We saw some mention of it in a foreign paper. Has it been tried in this country, and what are its advantages, if any? Respectfully yours,
READERS.

[It is the chippings from granite quarries, or other small pieces of granite. It is mixed at the place where it is to be used with Portland cement in sufficient quantities to make a thorough bond between the pieces, and put down in blocks or squares, so as to form separate stones, as it were. Its surface is kept comparatively rough by the cement wearing below the points of the granite. Its advantage is, presumably, cheapness. We do not know where it has been tried in this country, but it is possible some of our readers may be able to furnish the information.]

Novelties.

OUR illustration this week represents an improved ash-chute for use in high buildings, such as tenement-houses and a certain class of apartment-houses. A represents the conductor-pipe extending from the top floor of the building to a receptacle in the basement or cellar. The conductor is preferably constructed of sections of cast-iron pipe fitted together with calked joints, so that the conductor is water-

tight, that it may be washed out when required. B represents a receiver, one of which is arranged on each of the



floors of the building, and connected with the conductor by an inclined branch-pipe, *b*. The receiver is constructed in the form of a square hopper, and closed at the top by a hinged cover and at the front by a hinged door. E represents an ash-sifter, arranged in the upper portion of the receiver, and resting on horizontal ways. H represents a hinged valve, arranged to close against the seat, *h*. The treadle I is provided with a weight, J, to hold the valve closed and prevent draught when the top is lifted. An application of the foot to the treadle discharges the dust-lock B. The inventor is Mr. James Berry, of Buffalo, N. Y.

Reviews of Books.

PUBLIC HEALTH PAPERS AND REPORTS, Vol. IX., Presented at the Eleventh Annual Meeting of the American Public Health Association, 1883. 453 pages. 8vo.

This handsome volume is highly creditable to the association and to its editor, Dr. Irving A. Watson, of Concord, N. H., and is worthy of its place in what is already a valuable series, with every prospect of becoming still more so as the years go on. The space which is available for this notice would hardly be sufficient for a list of the papers and reports contained in this book, and we must therefore confine ourselves to a few of the most original. Malaria is the subject of papers by Drs. Sternberg, Woodhull, and Smart of the Army, and by Dr. Webb, of Alabama. All are interesting and call attention to the multiplicity of probable factors in the problem, Dr. Sternberg discussing more especially micro-organisms; Dr. Woodhull, the influence of the presence of organic matter; and Dr. Smart the conveyance of the cause of the disease through drinking-water, while Dr. Webb dwells rather on the medical aspects of the disease and the change in type which it has undergone in Alabama during the last fifty years.

Dr. Salmon, Veterinary Surgeon of the Department of Agriculture, contributes a paper on Texas cattle fever, taking the ground that it is a distinct specific disease spread by cattle from Texas. On the other hand, Dr. J. R. Smith, U. S. Army, presents a paper containing the results of numerous observations on Texas cattle in various localities, from which he is skeptical as to the occurrence of such a disease in Texas, and especially so as to its being transmitted by Texas cattle who are apparently in good health. The question is one of great practical interest, and one which it would seem could be settled by a series of careful experiments, which, however, are yet to be made.

On the subject of the adulteration of food, papers are given by Dr. W. K. Newton and Professor A. R. Leeds. Both are substantially agreed that what is needed at present is the enforcement of existing laws in order that they may be tested and, if necessary, amended. The tendency is to allow them to become dead letters on the statute book.

The report of the Committee on Compulsory Vaccination has already been noticed in THE SANITARY ENGINEER. It is a valuable document, and, taken in connection with the papers on small-pox and vaccination contained in the last report of the Illinois State Board of Health, forms a very good *résumé* of existing knowledge on the subject.

The description by Dr. De Wolf, of Chicago, of the successful attempt to provide the working classes with healthy houses which has been made in the city of Pullman, is one which should be read by all who are interested in practical sanitation.

To us one of the most interesting parts in this volume is the very full report which is given of the discussions on the several papers presented. To read it is almost as good as to have been present—perhaps even a little better, for one has the privilege of "skipping" without trouble. The financial condition of the association appears to be very satisfactory, the treasurer reporting a balance of over \$1,000 on hand. The number of paying members appears to have been over 300. It may not be as generally known as it should be that the volumes of transactions of the association can be purchased by persons who are not members of the association on application to the treasurer, Dr. J. Berrian Lindsley, of Nashville, Tenn., and we would strongly urge those who are interested in sanitation, but who are not members, to take advantage of this opportunity, and thus benefit both the association and themselves.

FIFTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF ILLINOIS. 633 pp. 8vo. Springfield, Ill., 1883.

While this report is nominally for the year 1882, it includes a certain amount of data belonging to the year 1883, and this is especially the case with regard to the very full report on small-pox in Illinois for the years 1880-83. The board justly points with some pride to this report, remarking that "so far as the board is aware, no epidemic in this country has been so widely and intelligently observed, and so faithfully recorded, as the small-pox epidemic of 1880-82 in Illinois." In the course of this outbreak 77 out of the 102 counties of the State were invaded, "causing an aggregate of 8,856 cases and 2,978 deaths, and involving a cost of nearly four and a-half millions of dollars, exclusive of the value of human life lost and the disabled condition of many of the survivors." It is made clear by the report that the epidemic was due to the fact that the people were, as a rule, unprotected by vaccination—that it was checked and subdued by vaccination on a grand scale. The connection of the influx of unprotected immigrants with the origin and continuance of the outbreak is also shown by a table of mortality from small-pox in the city of Chicago from 1851 to 1882. "Small-pox has reappeared in Chicago nineteen (19) different times, after periods of entire freedom from the disease; and in fourteen (14) of these reappearances it is positively known to have been introduced by immigrants, and to have spread directly among and from them."

Dr. Rauch concludes that "State and municipal effort and expenditure are inadequate to the control of small-pox during seasons of great immigration movement from infected countries," and "that a continuous sanitary surveillance of immigrant travel is necessary to supplement whatever other preventive measures can be secured before embarkation or during the voyage."

A very important and interesting part of this report is that relating to vaccination, in which a large amount of statistical data is given in a form which will be found very convenient for study and reference.

Among other figures we are given those relating to 187,-223 vaccinations, reported by 493 physicians. Of these the number of primary vaccinations with bovine virus was 93,303, of which 82,363, or 88.27 per cent., were successful, and with humanized virus 35,538, of which 34,076, or 95.88 per cent., were successful. Of 55,325 re-vaccinations with bovine virus, 39,331, or 71.47 per cent., were successful, and of 3,357 re-vaccinations with humanized virus, 2,398, or 71.43 per cent., were successful. In this large number of vaccinations only four cases of erysipelas are reported, and the board has been unable to discover any case of amputation or death occasioned by vaccination, although many rumors of such cases were investigated.

Dr. Rauch concludes that compulsory vaccination of all public scholars before admission to the school-room is the duty of the State, and that the State has also a right to demand such precautions on the part of officers and inmates of State institutions, and of common carriers, as will secure them against small-pox.

A large part of the volume is occupied with copies of the laws of the several States and of Canada relating to the practice of medicine, together with an account of the various medical colleges, and statistics of the same, the whole forming an exceedingly valuable work of reference. We congratulate the board, and especially its secretary, Dr. Rauch, upon this report, which is one of the best sanitary

documents we have seen for a long time, and which will be permanently valuable for reference to both physicians and sanitarians.

ANNUAL REPORT OF THE MEDICAL OFFICER OF THE GOVERNMENT BOARD FOR THE YEAR 1882. 263 pp. 8vo. London, 1883.

This is the supplement to the twelfth annual report of the Local Government Board, and is, as usual, one of the most instructive and valuable of the regular annual reports issued by the English Government. The report of the Medical Officer, Dr. George Buchanan, concisely and clearly summarizes the information contained in the appended documents, but beyond this says little or nothing, except to give the bad news of the retirement, on account of ill health, of Mr. Netten Radcliffe from the office of Assistant Medical Officer of the Board, who has since died.

The returns of vaccination show that the vaccination of all the children born in England and Wales during the year is accounted for in the local registers, except 4.69 per cent. In connection with this subject a very convenient summary of the laws regulating vaccination in various countries in Europe is given, and Dr. Buchanan remarks in connection with this that a general increase of stringency in requiring vaccination is observable in the laws of various countries since the severe epidemic of small-pox in 1870-71.

Mr. Shirley Murphy gives an account of the operations of the animal vaccination institution at Lamb's Conduit Street, which seems to work well. Of the reports on local outbreaks of disease, one of the most interesting is that by Mr. Power on an outbreak in London of scarlet fever, believed to have been distributed by milk. While in this case there seems no reason to doubt that the milk was in some way the cause of the epidemic, it was nevertheless impossible to discover any way by which the milk could have become infected with human scarlatina, although its history could be traced with much precision. This led to the hypothesis that the milk might have derived its infective power from the cow, which led to some experiments by Dr. Klein, to ascertain whether the cow is liable to suffer from any disease allied to scarlatina. He found that a cow, having recently calved, when inoculated experimentally with human scarlatina, may become affected by a disease which can be transmitted after the manner of an acute specific disease to dogs. This disease in the cow does not produce marked fever nor alter the quantity or visible character of her milk. The next step in the inquiry would be to ascertain whether the milk of an animal so affected could convey the disease, and whether the cow is liable to any similar affection without inoculation.

At present it can only be said that this hypothesis is extremely improbable.

The report of Mr. Spear on the occurrence of malignant pustule among persons engaged in the London hide and skin trades shows the dangers connected with foreign hides, and especially with those brought from China.

In consequence of representations from the United States that small-pox was being imported into America by immigrants from Europe, Dr. W. H. Blaxall was instructed to make an inquiry into the subject, with reference specially to the spread of infectious disease by migrants, and his report contains much useful and interesting information. It does not appear from his statistics that the amount of preventable disease occurring in emigrant ships leaving the United Kingdom is large, but it must be remembered that a very little of this kind of seed may produce a large and troublesome crop in a short space of time. Dr. Blaxall reports that sufficient precautions are not taken to secure disease prevention in emigrants; that the medical examinations are not of much practical value; that England has no satisfactory system of protecting her people against contagious disease brought to her shores by persons coming from the Continent to emigrate in English ships; and that there is a "necessity for better means of regulating the passenger traffic, with a view of protecting the British public, the emigrants, and other countries against the spread of dangerous infectious disease."

Dr. Klein makes a report on bacillus anthracis, more especially as to Pasteur's statements as to the possibility of protecting animals against anthrax by vaccination with attenuated virus. The results of his experiments are very different from those stated by M. Pasteur. Either he obtained no result whatever with his artificially cultivated and attenuated virus, or else the animal was killed by it, as it would have been by inoculation with the original virus. Thinking that perhaps his method of culture and attenuation was at fault, he procured some of the artificial virus prepared at M. Pasteur's laboratory, and sold as "vaccin

charbonneux," but this proved to be either inert and non-protective, or else killed the animals inoculated with it. "It cannot but be inferred," says Dr. Buchanan, "that the substances issued from M. Pasteur's laboratory are extremely uncertain in quality." This is certainly a mild way of stating the conclusions which most persons will draw from Dr. Klein's experiments. Dr. Klein also contradicts M. Pasteur as to the persistence of vitality of the germs of anthrax in the bodies of its victims. He finds that the "bacilli, however numerous they are in an organ of an animal at the point of death, go on after death to degenerate till they have altogether disappeared; and consequently the organs are perfectly harmless when this degeneration has become complete."

This, however, must be taken with the proviso that the animal is not opened after death and the sections exposed to the air, for in such a case the bacillus goes on to form its spores, which are very persistent in retaining their infective powers. These observations are in accord with those made by Koch, and are calculated to create a very considerable amount of distrust in Pasteur's statements. Dr. Burdon Sanderson furnishes a "memorandum in lines of research concerning infection and disinfection," which seems rather obscure. He assumes that contagion is due to vegetable organisms, and that all contagious microphytes are descended by evolution from ordinary bacteria of putrefaction, and urges experiments on the septic ferments as a basis for an application of the successful methods of investigation, whatever these may be, to the specific contagia. This, however, has been done before, and he gives no hint as to any new line of experiment. We are glad to see that Dr. Thudichum has apparently made his final report on the chemical constitution of the brain. His papers on this subject, however valuable they may be, have always appeared to us singularly out of place in these sanitary reports, and we cannot think that the line of his work has been at all what was intended or hoped by Mr. Simon at its commencement.

AMERICAN PUBLIC HEALTH ASSOCIATION.

THE twelfth annual meeting of the American Public Health Association will be held at St. Louis, Mo., convening on Tuesday, October 14, and continuing for four days. On Monday, October 13, a conference of State Boards of Health will meet at Liederkrantz Hall. On the same day there will be a meeting of the Executive Committee of the Public Health Association at the Southern Hotel. The following is a full list of the papers promised for the meeting:

1. *Hygiene of the Habitations of the Poor.*—Major Samuel A. Robinson, Inspector of Plumbing of the District of Columbia; Charles W. Chancellor, M. D., Secretary State Board of Health, Maryland; William K. Newton, M. D., Health Officer, Paterson, N. J.
2. *Hygiene of Occupations.*—George H. Rohé, M. D., Professor of Hygiene, College of Physicians and Surgeons, Baltimore, Md.; Walter Wyman, M. D., Surgeon U. S. Marine Hospital Service; J. W. Chambers, M. D., Baltimore, Md.
3. *School Hygiene.*—Samuel W. Abbot, M. D., Health Officer State Board of Health, Lunacy, and Charity, Mass.; Edward M. Hartwell, M. D., Johns Hopkins University; Stephen O. Richey, M. D., Washington, D. C.; Felix Formento, M. D., New Orleans, La.
4. *Adulteration of Food.*—Hon. Erastus Brooks, Member State Board of Health, N. Y.; Prof. H. B. Cornwall, Princeton College, N. J.; Charles E. Munroe, S. B., Prof. of Chemistry, U. S. Naval Academy, Annapolis, Md.; Prof. V. C. Vaughan, M. D., Member State Board of Health, Ann Arbor, Mich.; J. Cheston Morris, M. D., Philadelphia, Pa.
5. *Water Pollution.*—Major Charles Smart, M. D., Surgeon U. S. Army, Member of the National Board of Health; Henry M. Baker, M. D., Secretary State Board of Health, Mich.; Thad. M. Stevens, M. D., Indianapolis, Ind.
6. *Disposal of Sewage by Irrigation or Chemical Action.*—Henry P. Walcott, M. D., Chairman State Board of Health, Lunacy, and Charity, Mass.; George N. Bell, C. E., Newport, R. I.; W. John Harris, M. D., St. Louis, Mo.
7. *The Observable Effect Upon the Public Health of Official Sanitary Supervision.*—Colonel George E. Waring, C. E., Secretary National Board of Health, Newport, R. I.
8. *The Work of Municipal and State Boards of Health.*—Reported by their secretaries.
9. *On Disease-Germs.*—Major George M. Sternberg, M. D., Surgeon U. S. Army; L. Bremer, M. D., St. Louis, Mo.; W. W. Vinredge, M. D., Member State Board of Health, Lafayette, Ind.; W. H. Stillwell, M. D., Humboldt, Tenn.
10. *Cremation as a Sanitary Measure in Times of Great Epidemics.*—John Morris, M. D., Baltimore, Md.; Rev. John D. Beugless, Chaplain U. S. Navy, Brooklyn, N. Y.

11. *A Survey of the Present Sanitary Situation in St. Louis.*—Being a series of short papers on leading public health topics, contributed by city officials and local sanitarians.

(a) The Situation, Soil, and Surroundings of St. Louis, considered from a Hygienic Standpoint, by Colonel Henry Flad, C. E., President Board of Public Improvements; (b) Organization of Health Department, Sanitary Legislation, and the Abatement of Nuisances, by John D. Stevenson, Esq., Health Commissioner; (c) Sources, Quality, etc., of the Milk and Meat Supplies of St. Louis, by Joseph Spiegelhalter, M. D., Member Board of Health, and J. C. Cabanné, Esq.; (d) Street-Paving and the Public Water-Supply, by Thomas J. Whitman, Water Commissioner, and J. W. Turner, Street Commissioner; (e) On the Average Temperatures and Prevailing Climatic Conditions of St. Louis, by Prof. F. E. Nipher, Washington University; (f) Public Sewerage and House Drainage, by Robert Moore, C. E.; (g) The leading local (productive) Industries, and their Effect on the Health and Lives of their Operatives, by George Homan, M. D.; (h) The Infant and School Populations and existing Causes unfavorable to their Health, by J. P. Kingsley, M. D., Professor of Physiology and Diseases of Children, Missouri Medical College; (i) The Chief Local Factors in the Causation of Disease and Death, by Robert Luedeking, M. D., Professor Pathological Anatomy, St. Louis Medical College.

Several papers have been promised in addition to the above, among which are: On Heating and Ventilation, Charles O. Curtman, M. D., Professor of Chemistry, Missouri Medical College, St. Louis, Mo.; on Protective Spectacles, Adolphus Alt, M. D., Editor *American Journal of Ophthalmology*, St. Louis, Mo.; on Prevention of Syphilis, J. D. Gatch, M. D., Lawrenceburg, Ind.; on Hygiene of the Nervous System and Mind, C. H. Hughes, M. D., Editor of the *Alienist and Neurologist*, St. Louis, Mo.; on the Sanitary Management of Railway Cars and Stations, W. Thornton Parker, M. D., Acting Assistant Surgeon U. S. Army.

THE ARLBERG RAILWAY TUNNEL.

ON September 20 the Emperor of Austria opened the Arlberg railway tunnel with great ceremony, and the entire line is now open both for carrying passengers and goods. This line will be the most direct route of communication between a large part of the Austrian monarchy and Switzerland and the southern part of France, and is very important from a commercial, as well as interesting from an engineering standpoint, forming an outlet for the productions of the Tyrol and the Vorarlberg departments. It runs from Innsbruck to Landeck through the Inn Valley; from Landeck to St. Anton through the Rosanna Valley; from St. Anton to Langen through the Arlberg; and from Langen to Bludenz through the Kloster Valley. At Roppen is a bridge of 250-feet span, at Imst one of 132-feet span, at Landeck one of 198-feet span, and at Wietzberg one of 394-feet span. The great engineering feat of the road, however, is the tunnel, 10,250 metres (6.13 miles), in the mountain section of the road between Landeck and Bludenz.

Work on the tunnel began on July 25, 1880; the perforation took place on November 19, 1883, and the tunnel proper was practically complete in July of this year. The following facts in regard to its construction we abstract from the *London Morning Post*:

"The boring of the great Arlberg tunnel proceeded very rapidly. Instead of the estimated daily progress of 6.60 metres (21½ feet), the heading was driven at the average rate of 9.50 metres (over 31 feet). The experiences gained in the construction of the Mont Cenis and St. Gothard tunnels were of the utmost value, and served as a guide. On the eastern side of the Arlberg tunnel Ferroux boring-machines, driven by compressed air, and on the west Brandt machines, worked by water under a pressure of from 80 to 100 atmospheres, were employed. The tunnel has two lines of rails, and is walled up along its whole length. In places where great pressure showed itself, the walling has been made very thick, and headings for carrying off the water have been driven at intervals for nearly 60 feet into the sides of the tunnel. From St. Anton, where the tunnel entrance is 4,272 feet above sea level, the great tunnel rises 2 feet per 1,000 for 2½ miles, and falls from this point toward Langen (entrance 3,991 feet above the sea) 15 feet per 1,000 for a length of nearly 4 miles. The cost of the finished tunnel is 4,200 francs per metre run (slightly over £50 per foot run). Besides the great tunnel, the Arlberg railway has nine small tunnels, varying in length from 214 feet to 696 feet. Their aggregate length is nearly one mile. All these tunnels are also completely walled up, the average cost being only 850 francs per metre run. For securing the railway against freshets, stone and snow avalanches, and land-slips, a large number of supporting walls, aqueducts, and roofings for protection against avalanches had to be constructed at great expense. The total cost of the Arlberg railway and tunnel is, in round numbers, £3,480,000."

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING SEPTEMBER 27, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	16	23.8	5	31.2	1		3		4													1
Boston	Mass.	435,000	201	24.0	96	47.7	5		27	4	20	6		8		3	8	4	7			5		5
Lowell	Mass.	71,500	35	25.5	20	57.1			2		13			1		1	1		1					
Worcester	Mass.	69,000	32	24.1	16	50.0	1		6	2	10	2		1										
Fall River	Mass.	67,000	22	17.1	16	72.7					9								2					
New Haven	Conn.	69,500	28	20.9	8	28.5		1	1		2	1		1										
Providence	R. I.	125,000	39	16.2	17	43.5			4		8	1		1		2				1				2
Total		872,000	373	22.2	178	47.7	7	1	43	6	66	10		12		6	9	4	10	1		5		8
EASTERN CITIES.																								
Albany	New York	103,000	41	20.7	6	14.6	4	10	1	2				1		1	1							
New York	New York	1,355,000	647	24.8	283	43.7	38	5	97	14	85	10	2	14	7	3	40		21		5	4		11
Brooklyn	New York	670,000	276	21.4	137	49.6	5		33	6	59	8		5	4	1	7	1	9					8
Hudson County	New Jersey	225,000	92	21.3	41	44.5			10		7	2		2	2	3								
Newark	New Jersey	154,000	80	27.0	33	41.2	2		7	6	2	7		2	1	1	3	2	1					
Philadelphia	Pa.						1	1	2	1	1	1		1	1									
Wilmington	Delaware	50,000	20	20.8	10	50.0																		
Total		2,557,000	1,156	28.5	510	44.1	50	16	150	29	154	28	2	25	15	9	51	3	31		5	8		19
LAKE CITIES.																								
Buffalo	New York																							
Rochester	New York																							
Cleveland	Ohio	210,000	81	30.0	52	64.1	1	1	9		25	4		6	2		4		1					1
Detroit	Michigan	140,000	71	26.4	47	66.1			2	3	18	7					1							
Chicago	Illinois	650,000	225	18.0	130	57.7	9	1	22	2	40	11		5	1	3	9	3	11			2		3
Milwaukee	Wisconsin																							
Total		1,000,000	377	19.6	229	60.7	10	2	33	5	83	22		11	3	3	14	3	12			2		
RIVER CITIES.																								
Pittsburg	Pa.	210,000	80	19.8	33	41.2	5		5		6	6		6		1	3		5					1
Cincinnati	Ohio																							
Louisville	Ky.	137,000	47	17.8	17	36.1	3		10	1	3			2			1		1		1			
Indianapolis	Ind.																							
Minneapolis	Minn.	100,000	40	20.8	19	47.5		2	4	2	4	4		6			1	1			1			
Evansville	Ind.	34,000	20	30.6	8	40.0	1				8			3										
Kansas City	Mo.																							
St. Louis	Mo.	375,000	154	21.3	71	46.1	9		17	4	20	8		10	12	4		3	7					
Total		856,000	341	20.7	148	43.4	18	2	36	7	41	18		27	12	5	5	4	13		1	1		1
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	56	21.8	22	39.2	1		7		6	2	1	3	5	2								2
Richmond	Va.	60,800	40	30.0	22	55.0	2		5		5			4	4			1	1		1	1		
Charleston	S. C.	41,000	14	17.7	3	21.4					1													
	Col.	32,400	21	33.7	8	38.0				2							1				1			
Atlanta	Geo.	25,000	10	20.8	4	40.0			2	10	1	1		1										
	Col.	27,800	25	46.8	6	24.0			4		3			2			1	1						
Augusta	Geo.	30,000	8	13.8	4	50.0	1				5			1										
	Wh.	20,000	14	36.4	7	50.0			3		6			1							1			
Savannah	Geo.																							
	Wh.																							
	Col.																							
Nashville	Tenn.	35,100	13	19.2	6	46.1	2		1		1													
	Col.	21,800	9	22.0	8	33.3	1		2	1	2	1			3		1					1		
New Orleans	La.	171,000	63	19.1	20	31.7	4		7	2	5	4		2	7	1						1		
	Col.	68,000	37	30.5	9	24.3			7		3				6		1					1		
Total White		435,900	164	19.6	59	35.9	8		17	2	20	8	1	11	15	3		4	2	1		2	3	1
Total Colored		238,800	146	32.5	55	37.6			28	1	20	1		1	12			2	1			3		1
Total in 28 U. S. Cities		5,954,700	2,557	22.8	1,179	46.1	96	21	302	50	384	87	3	87	57	26	83	16	67	1	8	20		35
Total for 4 weeks ending September 27, 1884		6,825,150	12,327	28.4	5,874	47.5	496	85	1,422	143	2,221	310	23	421	215	128	360	59	198	7	68	102	4	189
September 13.	Total in 28 English Cities	8,762,354	3,588	21.4			118				531	31		45		65					46		13	71
" 13.	8 Scottish Cities	1,254,607	519	21.5			21				55	15		10		17			65					21
" 13.	16 Irish Cities	858,660	380	28.0			4			55	35	3		2		19			53					3
" 13.	139 German Cities																							
" 13.	15 Swiss Cities																							
" 13.	15 Swiss Cities	455,537	150	17.2			7		19		21	1	1	2		1			11			1	1	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

In 28 cities of the United States having an aggregate population of 5,954,700, there were reported during the week, which ended September 27, 1884, 2,557 deaths, which is at the rate of 22.3 per 1,000 annually. Children under 5 years of age contributed 46.1 per cent. of the total deaths. The annual death-rate in the North Atlantic cities was 22.2; in the Eastern cities 23.5; in the Lake cities 19.6; in the River cities 20.7; and in the Southern cities, for the white population 19.6 and for the colored 32.5 per 1,000.

Accidents caused 3.7 per cent. of all deaths. Consumption caused 11.8 per cent. of all deaths, the proportion being highest among the colored in the Southern cities, 15.7 per cent., and lowest in the Lake cities, 8.7 per cent. Diarrhoeal diseases caused 15.0 per cent. of all deaths, against 16.4 per cent. for the previous week, the proportion being highest in the Lake cities, 21.9 per cent. There was a considerable increase in the mortality from diphtheria, 3.4 per cent. of all deaths being attributed to it, against 2.7 per cent. for the previous week. It was especially prevalent in the Lake and River cities, where it caused respectively 5.8 and 5.2 per cent. of the deaths. Typhoid fever caused 3.4 per cent. of the deaths. In the River cities it rose to 7.9, and in the Southern cities, among the whites, to 6.6 per cent. of

the deaths. Malarial fevers caused 2.2, scarlet fever 1.0, pneumonia 3.2, bronchitis 2.6, measles 0.6, and whooping-cough 1.3 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 40 new cases of typhoid fever, 16 of diphtheria, and 30 of scarlet fever. During the week ending September 20 there was 1 death from yellow fever.

DETROIT, MICH.—Dr. O. W. Wight reports 23 new cases of diphtheria and 2 of scarlet fever.

BALTIMORE, MD.—The weekly report of the Health Officer records 162 deaths, of which 61 were under 5 years of age. The annual death-rate for the whole population was 20.59 per 1,000, or 18.32 for the whites and 33.80 for the colored. Diphtheria caused 10 deaths, croup 1, whooping-cough 2, typhoid fever 6, malarial fevers 6, diarrhoeal diseases 16, consumption 24, and violence 4.

MASSACHUSETTS.—During the week ending September 20, in 109 towns of the State, with an aggregate population of 1,345,140, there were 534 deaths, which is equivalent to an annual death-rate of 20.6 per 1,000, against 22.0 for the previous week. Of the decedents 226, or 42.3 per cent., were under 5 years of age. The principal zymotic diseases caused 145 deaths, among which were diarrhoeal diseases 91, diphtheria and croup 16, typhoid fever 16, whooping-cough 9, scarlet fever 6, puerperal fever 2, and yellow fever 1. To consumption were attributed 83 deaths, and to lung diseases 16. The highest rates recorded were 34.0 in Brockton and 29.6 in Boston.

ENGLAND.—The Registrar-General's report for the week ending September 13 records in the 28 large towns of England and Wales an annual death-rate of 21.4 per 1,000. The highest annual death-rates from diarrhoeal

diseases were 9.9 in Blackburn, 9.4 in Leicester, and 8.9 in Hull. These rates show a considerable decrease as compared with the previous week. The 31 deaths from diphtheria include 22 in London. Small-pox caused 11 deaths in London, 2 in Liverpool, 1 in Sheffield, and 1 in Hull. The highest mortality was in Blackburn, 35.4, and the lowest in Brighton, 0.2 per 1,000.

LONDON.—Births, 2,604; deaths, 1,373, the latter being equivalent to an annual death-rate of 17.8 per 1,000, which is 2.1 less than that of the previous week. The number of fatal cases of small-pox was 11, including 2 deaths in the hospitals. The number of small-pox patients in the hospitals, which was 544 the preceding week, fell to 508, there having been 70 new cases admitted during the week. The deaths from diarrhoea has steadily decreased, and for the week numbered 126, against 178 for the previous week, but still exceeded the corrected weekly average by 18. Measles caused 11 deaths, scarlet fever 23, diphtheria 22, whooping-cough 27, typhoid fever 16, consumption 162, lung diseases 170, and violence 57.

SCOTLAND.—The death-rate in the eight principal towns for the week ending September 13 was 21.5 per 1,000, or 1.8 above that of the corresponding week last year, and 1.0 above that for the previous week this year. Aberdeen recorded the lowest rate, 15.0, and Leith the highest, 25.8 per 1,000. Whooping-cough was the most fatal zymotic disease.

EDINBURGH.—Deaths, 79; annual death-rate 16.7 per 1,000. Scarlet fever caused 2 deaths, whooping-cough 1, fever 2, diarrhoea 7, acute lung diseases 10, and violence 1.

GLASGOW.—Deaths, 246; annual death-rate 24.7 per 1,000. Scarlet fever caused 13 deaths, whooping-cough 10, fever 5, diarrhoea 27, acute lung diseases 31, and violence 10.

IRELAND.—The return of the Registrar-General for the week ending September 13, records a death-rate of 23.0 per 1,000 in the 16 principal town districts.

DUBLIN.—Deaths, 190; annual death-rate, 27.7 per 1,000. Scarlet fever caused 11 deaths, typhus fever 2, whooping-cough and diphtheria each 1, typhoid fever 1, diarrhoea 23, consumption 25, acute

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
October 4....	24.05	17.79	23.14	30.21	28.32	18.83

E. G. LOVE, Ph.D., Gas Examiner.

CONSOLIDATION OF THE NEW YORK GAS COMPANIES.

EARLY in November the seven principal gas companies of this city, excepting the Equitable, which was organized about two years ago, will submit to their stockholders the project of consolidation into a single incorporation. As, from the magnitude of the capital involved, this measure is of great public interest, we have taken the following particulars from the New York *Tribune*, having ourselves been at the pains of verifying it in an interview with an officer of one of the companies. We are informed that in all probability the stockholders of the seven companies will authorize the consolidation:

The act of the New York Legislature, by virtue of which the consolidation is legally possible, prescribes that the directors of corporations intending to combine shall enter into an agreement specifying the terms and conditions of consolidation, and the mode of carrying the measure into effect. This has already been done by the seven gas companies of the city. The law requires further that a notice of at least thirty days shall be issued to the stockholders of the companies intending to consolidate, that they may meet and pass upon the measure. A vote of two-thirds of the stockholders of each company is necessary for a ratification. The number of trustees of the new corporation is limited to thirteen, and the extent of its duration to fifty years. For the first year the affairs of the new company are intrusted to the management of a board of trustees, whose names are to be specified in the agreement entered into by the directors of the combining companies. It is not known who have been chosen by the gas companies to fill these positions, but it is believed that the list includes Percy R. Pyne, James W. Smith, Treasurer of the Manhattan Gas-Light Company; Henry Day, Charles Roome, President of the Metropolitan; Oscar Zollikofer, President of the Municipal; Thomas Rutter, President of the Harlem, and John Kennedy, President of the New York Mutual. The capital stock of the new company is estimated at \$45,000,000, but many of the companies have issued bonds upon their real estate, and have other obligations which form liens upon their property. The companies are at liberty to pay off these obligations at the time of the consolidation. If they do not do so, the new corporation will retain from the shareholders of each company a sufficient quantity of the new stock to pay off all debts and incumbrances. By the sale of the stock so retained the new company will be enabled to begin business free from all pre-existing obligations. The following is believed to be an approximately correct statement of the value at which the capital stock of each of the companies is to be received in the consolidation:

New York Gas-Light Co.	\$7,221,000
Manhattan Gas-Light Co.	12,352,000
Metropolitan Gas-Light Co.	7,422,000
New York Mutual Gas-Light Co.	5,922,000
Municipal Gas-Light Co.	5,276,000
Knickerbocker Gas-Light Co.	3,104,000
Harlem Gas-Light Co.	3,103,000
Total.....	\$45,000,000

Of this capital about \$1,500,000 will be retained as a working capital. The remainder will be divided into shares of \$100 each, and distributed among the stockholders of the several companies. The distribution of shares among the companies will be in about the following proportions:

	Shares.
The New York Gas-Light Co. will receive.....	75,600
The Manhattan Gas-Light Co. will receive.....	119,400
The Metropolitan Gas-Light Co. will receive.....	71,750
The New York Mutual Gas-Light Co. will receive.....	57,250
The Municipal Gas-Light Co. will receive.....	51,000
The Knickerbocker Gas-Light Co. will receive.....	30,000
The Harlem Gas-Light Co. will receive.....	30,000
Total.....	435,000

In case the stockholders of any of the companies fail to ratify the agreement which has been entered into by the directors, that company will be omitted in the consolidation, and the other companies will still combine. The capital of the new corporation will be diminished by the sum at which the capital of the refusing company is valued. Each of the companies is to appoint one of its officers or directors to act as a member of a committee, to which all questions and differences which may arise between the several companies are to be submitted. The consolidation is expected to produce a reduction in the price of gas, but what that reduction will be the officers of the existing companies are unable or unwilling to say at present.

THE managers of the New Orleans Exposition have awarded the following contracts for lighting the buildings and grounds: The Leavitt-Mueller Electric-Light, 800 arc-lamps for the main buildings; the Brush Electric-Light, 300 lamps for the Government and State exhibit building; the Jenny Arc-Light, 100 lamps, with five star iron towers for the grounds and the live-stock department; Thompson & Houston, 100 arc-lights for the machinery, extension, and saw-mill; Edison Incandescent Light, 4,800 lights for the Music Hall, Horticultural Hall, the Art Gallery, State headquarters, and offices. Each principal entrance and wharf will be lighted by six Leavitt-Mueller lamps. Fifteen hundred horse-power is required for the electric-light, which costs the exposition over \$100,000.

A SPECIAL committee of the Philadelphia Council is considering the question of the future management or disposition of the city gas-works. Several plans have been suggested—namely: Continuing the Gas Trust as at present; placing the works in the charge of a superintendent to be selected by the Council; leasing the works for a term of years, or selling them to outside parties.

THE officers of the gas companies in Ohio have recently effected a State organization, with General Hickenlooper, of Cincinnati, as President.

TOLEDO, O.—The Citizens' Electric-Light Company, capital \$50,000, which had been doing business in this city for about two years with moderate success, recently became somewhat embarrassed by some claims immediately pressing, so that a change was necessary. Accordingly, within a few days, a reorganization has been effected. The new company, the Toledo Electric Company, with a capital of \$150,000, will take the assets of the Citizens and assume the liabilities. President, L. S. Baumgardner; Secretary, F. B. Dodge. The two electric-light companies of this place, the Citizens and the Brush, have been rapidly extending their business, but their officers claim they have been doing it at too low rates.

Something of a contest has been going on between the gas company and the two electric-light companies of this place, especially with reference to lighting the new Cherry Street bridge, and occupying the territory of the Sixth Ward, East Toledo. When bids were first called for on the bridge, the gas company and the Citizens' Electric-Light Company put in bids at the same figure, \$800 per year. The committee considered this too high and called for more bids, when the gas company failed to respond. The two electric-light companies proposed to furnish lights at sixty and seventy cents each per night, respectively. One of these was recommended by the committee, but the council failed to confirm the contract.

GAS USED IN PARIS IN 1883.—The total amount of gas consumed in Paris in 1883 was 246,880,591 cubic metres. There was used by: Public highways, 23,217,177; municipal and military establishments, 16,072,312; State administration, 3,440,098; private consumers, 204,151,004.—*Chronique Industrielle*.

THE H. C. Frick Coke Company, of Connellsville, Pa., has been making experiments on the incandescent electric-lamp for use in mines. The principal point to be determined is the cost of the light.

THE laying of an underground electric-cable for telephone purposes was begun by the Philadelphia authorities October 2.

Just before a ballet at Niblo's Theatre, in this city, one evening last week, a bouquet of crisp flowers hung above the stage, and lighted by Edison lamps, took fire. A ballet-girl, with much presence of mind, immediately seized it and took it off the stage. The flames were at once extinguished, and the curtain rose without the immense audience knowing anything of the accident.

THE Cooper lined-coal process for making gas has been in successful operation for the past ten months at the Tunbridge Wells (Eng.), gas-works. It was introduced there by Mr. R. P. Spice, Consulting Engineer to the company. The process consists in adding 2½ per cent. of lime, with its own weight of water, to the coal before introducing it into the retorts. The lime retains much of the sulphur and so simplifies the subsequent purification of the gas.

HERR WOLF, of Zwickau, Saxony, has invented a safety-lamp which burns benzine instead of oil. The body of the lamp is filled with mineral-wool to prevent the spilling of the benzine. The wire gauze is finer than that usually employed. The wick is of mineral-wool. There is an arrangement of percussion wafers by which the lamp can be lighted without opening it, and the lock of the lamp is operated by means of a magnet.

THE Philadelphia Gas Trust dates from the year 1835. At present the entire length of gas-mains is about 780 miles. The make of gas in 1883 was 2,445,368,000 cubic feet, and the number of meters and services is 104,061. The Trust lights 12,781 public lamps.

THE twelfth annual meeting of the American Gas-Light Association will be held in Washington on October 15, 16, and 17.

IN London gas of 16-candles costs 80 cents per thousand feet, in Manchester 20-candle gas costs 64 cents, in Newcastle 16-candle gas costs 45 cents, and in Glasgow 27-candle gas costs 84 cents. The cost per candle in these four cities is respectively 5, 3.2, 2.8, and 3.1 cents.

Association News.

BALTIMORE, MD.—The regular meeting of the Master Plumbers' Association was held October 2 in its rooms, Knapp's Hall, Holiday Street, First Vice-President Foster presiding. The usual number of members were present. After the transaction of the regular business letters were read from President Young and from certain wholesale dealers in favor of the Baltimore resolutions on protection. The Committee on Protection, through State Vice-President Wilson, reported that the Baltimore dealers, except four or five, signed the Baltimore resolutions on protection. The four or five who did not sign were not present. At the meeting all but one of the Washington dealers signed the same resolutions. It was on motion adopted to send all the names of the Baltimore dealers who signed the Baltimore resolutions to President Young, with a request to notify the trade.

THE CHICAGO MASTER PLUMBERS' ASSOCIATION met Oct. 1, at 125 Dearborn Street, Vice-President T. C. Boyd in the chair, and William Oliphant, secretary. A price-list was presented by Martin Moylan, and along with a resolution to increase the charge for plumber and helper from \$6 to \$8 a day was laid over for publication. James Dewald and J. H. Shannon were elected members, and the cost of membership was reduced from \$50 to \$10. The question was asked if there was any news from the National Executive Committee, of whom there were present Messrs. Wade and Moylan, the President, Andrew Young, being confined to his house by an attack of pleurisy.

Notes.

CONSTRUCTION.

TOLEDO, O.—A contract has been let to A. C. Lombard to put up a building at the corner of Oak and Superior Streets, for D. R. Locke, to be used for manufacturing purposes. It will be brick, three stories and basement, 100'x110' dimensions; cost, about \$20,000.

THE Town Board of Schaghticoke, N. Y., is receiving plans for a bridge across the Hoosick River, to cost about \$15,000.

WEYMOUTH, MASS.—The contract for a reservoir, 40 feet in diameter by 62 feet high, has been awarded by the commissioners of the town of Weymouth to the Cunningham Iron-Works of Boston.

BROOKLYN, N. Y.—Abstract of proposals opened September 26, for constructing a sewer in Pacific Street, between Albany and Troy Avenues: Thomas Newman, 12-inch pipe, \$1.42 per lineal foot; for 15-inch pipe, \$1.25 per lineal foot; for manholes, \$40 each. John S. Bogert & Co., 12-inch pipe, \$1.40 per

lineal foot; 15-inch, \$1.60 per lineal foot; manholes, \$37.50 each. P. J. Madden, 12-inch, \$1.31 per lineal foot; 15-inch, \$1.75 per lineal foot; manholes, \$39 each. Edward Gorman, 12-inch, \$1.27 per lineal foot; 15-inch, \$1.47 per lineal foot; manholes, \$37 each.

BROOKLYN, N. Y.—Bids opened for furnishing two boilers to be attached to second-class Amoskeag steam fire-engines: Hardie & Collins, for the sum of \$519 each; The Manchester Locomotive-Works, Aretas Blood, agent, for the sum of \$595 each. The La France Fire-Engine Co. (Informal).

BARDSTOWN, KY.—Proposals for building a covered wooden bridge, thirteen miles from Bardstown, on the Bardstown and Louisville turnpike, will be received until October 15. The bridge is 120 feet long, 18 feet wide, 100 feet between abutments. Address, John S. Humphreys, President of Bridge Company, Bardstown, Ky.

AURORA, ILL.—The City Council, September 29, passed an ordinance authorizing the issue of \$100,000 in 4 per cent. bonds for the construction of a system of water-works in the city. There is doubt whether the city can take advantage of the general State law which authorizes cities to bond themselves for the construction of water-works. It is supposed, therefore, that an issue will be made up by application for a writ enjoining the Mayor and City Clerk from carrying out the provisions of the ordinance passed October 1. The question will then be taken to the Supreme Court.

PHILADELPHIA, PA.—Bids have been opened at the Highway Department for a 2'x3' oval-shaped sewer on South College Avenue from Nineteenth Street westward 417 feet, the total length being 442 feet. The bidders were: M. C. Hong, at \$2.43 per lineal foot, \$23 for each manhole, and \$150 per wellhole; Bernard McNichol bid \$2.30 per lineal foot, \$25 per manhole, and \$125 for the wellhole; Henry C. Eyre bid \$2.21 per foot, \$27 and \$97 respectively for the manhole and wellhole. Eyre received the contract.

Bids have been opened by the Gas Trust for 500 lengths of 3-inch iron pipes and for 1,000 lengths of 2-inch pipe. The bidders were the Gloucester Iron Co., at 19 and 13 cents per foot respectively, and A. H. McNeil, whose bids were 20½ cents and 13½ cents respectively. The Gloucester Iron Company was awarded the contract. Bids have also been received for the construction of a wharf at the Twenty-fifth Ward Works, on the Delaware, as follows: Henhoeffer & Vaughan, at \$49,431.32; Davis, Irwin & Sanville, at \$37,000; John P. Eyre, at \$37,000; James S. Riff, at \$36,550; George C. Platt, \$34,995; E. Cubberley & Co., \$32,980; Neveling & Co., \$32,800. The bids were referred to a sub-committee for award.

THE Building Committee of the Concord, Mass., Railroad has extended the time for receiving proposals on the new iron train-house until October 10.

J. F. LEBARON, C. E., of Jacksonville, Fla., has been awarded the contract for building a bridge over the Little Arlington River, near Jacksonville. Contract price, \$21,650.

GOVERNMENT WORK.

WASHINGTON, D. C.—Contracts for construction of sewers were awarded to Thomas McCann, 3,418 feet, 4'x6' brick sewer at \$6 per foot; 500 feet 5.25'x7.87' brick sewer \$7.25 per foot; 2,170 feet of 10' brick sewer at \$15.49 per foot; J. E. Lyon, 400 feet 45'x6.75' brick sewer at \$6.32 per foot; H. L. Cranford, 2,900 feet 55'x8.25' brick sewer at \$10.29 per foot. These are the contracts for which bids were originally opened on July 31 and rejected because of informalities. The bids now accepted will make the total cost about \$10,000 less than the lowest prices bid July 31, and \$25,000 less than the next lowest bid of that date.

SYNOPSIS of bids opened September 25, 1884, by Gen. M. C. Meigs, supervising engineer and architect, for iron-work for roof over the new pension building, in Washington, D. C.: C. A. Schneider Sons, Washington, D. C., \$59,393; Fort Pitt Steam-Boiler and Bridge Works, Pittsburg, Pa., \$49,489; Riverside Bridge and Iron-Works, Paterson, N. J., \$44,444; Phoenix Iron Co., Trenton, N. J., \$48,875; Cheney & Hewlett, New York, N. Y., \$65,000; Penn Bridge-Works, Beaver Falls, Pa., \$44,375; Post & McCard, New York, N. Y., \$59,844; Sneed & Co. Iron-Works, Louisville, Ky., \$54,987; Pittsburg Bridge Co., Pittsburg, Pa., \$39,492; Passaic Rolling Mill Co., Paterson, N. J., \$43,833;

Keystone Bridge Co., Pittsburg, Pa., \$58,548; D. W. C. Carroll & Co., Pittsburg, Pa., \$51,000; Kong Iron Bridge Co., Cleveland, O., \$47,000; Haugh, Ketcham & Co., Indianapolis, Ind., \$47,838. Other bids were received after the time for opening from Shiffler Bridge-Works, of Pittsburg, Pa., for \$47,400; Union Foundry and Pullman Car-Wheel Works, of Chicago, Ill., for \$58,227. New Jersey Steel and Iron Co., Trenton, N. J., for roofs over office rooms, 3½ cents per pound; over court-yards, 5½ cents per pound.

COLONEL HAINS addresses a report to the Chief of Engineers advising the removal of the present Potomac River Long Bridge, and the construction of a bridge which will interfere less with the Potomac improvement scheme. The report will be submitted to the Secretary of War for transmission to Congress.

ROCK ISLAND ARSENAL bids for material will be opened October 15. The opening first announced for September 12 has been postponed to the later date.

POTOMAC RIVER DREDGING BIDS.—Above the Long Bridge at Washington, D. C.: P. Sandford Ross, one of the bidders, has requested that the bid of Benson, McNee & Co., of San Francisco, lowest bidders, be rejected as informal. Major Hains has referred the matter to the Secretary of War. Mr. Sandford Ross' bid is next lowest to that of Benson, McNee & Co.

PFIEFER & Co., of Cincinnati, O., have been awarded the contract for boring an artesian well in Savannah, Geo., and will begin work at once.

BIDDEFORD, ME.—The reservoir and pumping-station, two miles from this place, to supply water to Biddeford and Saco, is nearly completed. The capacity of the reservoir is 10,000,000 gallons. The work is the property of the Biddeford & Saco Water Company, John P. Gilman, of Haverhill, President, and George P. Wescott, of Portland, Treasurer. James Cunningham, of Portland, had the contract for the brick masonry work; Thomas Thomas, Jr., and Richard Shannahan, of Portland, had the contract to build the reservoir; E. P. Cummings, of Portland, was engineer; and L. C. Cummings & Co. furnished the cement. Ephraim Dyer, of Standish, who laid the Portland pipes, will lay those for Biddeford and Saco.

THE Chicago Dredging and Dock Company has received the contract for dredging Chicago Harbor at 23½ cents per cubic yard.

DANIEL CONSTANTINE has been awarded the contract for dredging a channel near Swan Point, James River, Va., at 10½ cents per cubic yard.

English Patents.

4,288. IMPROVEMENTS IN THE MANUFACTURE OF SANITARY BLUE COLORING MATTER.

The object of this invention is to manufacture blue coloring matter for the use of laundresses and others, which shall be capable of acting as a disinfectant in addition to its coloring property.

JAMES ELLIS, of 80 Seaton Street, Hull, in the county of York.
Prov. spec. September 3, 1883. (Price 2d.)

4,402. IMPROVEMENTS IN APPARATUS FOR JOINING LEAD PIPES.

This invention relates to the joining of lead pipes by the application of a flexible fibrous sleeve or other formed wrapper, composed by preference of asbestos, but other fibrous heat-resisting material may be used. The ends of the lead pipes to be joined are prepared by beveling them on the outside round the bore of the pipe, and inserting about half the length of a short, thin, hard metal tube in the end of each pipe. The ends of the lead pipes to be joined are then placed in the fibrous or asbestos sleeve or wrapper, and clamp the same or bind it tightly round the ends of the lead pipes, and by the application of heat, which may be applied externally by means of a jet of gas from a blow-pipe, or internally by molten metal conducted within the sleeve by means of a specially-formed, thin, hard metal funnel, with two or more outlets, to enable the metal to be supplied to different parts of the chamber when requisite at the same time, thus causing the ends of the lead pipes to be fused or burned together with lead, by which means a continuous homogeneous lead pipe practically results.

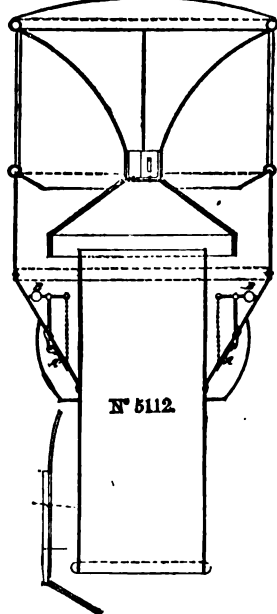
JOSEPH JAKENS, of Bury, in the county of Lancashire, consulting and technical chemist.
Prov. spec. September 14, 1883. (Price 2d.)

5,112. IMPROVEMENTS IN OR APPERTAINING TO VENTILATORS FOR SHIPS OR PUBLIC OR PRIVATE BUILDINGS, PART OF WHICH INVENTION IS APPLICABLE AS A LIFE-BUOY.

This invention consists in improvements on and additions to a former patent to the same person, No. 3,515 of 1881, by which it is made more valuable, and adapt it to upcast ventilating also.

The former invention was for downcast ventilators only, and had small holes to let the drip out. For heavy seas these were not enough, and if larger holes were added the sea broke into them, and they allowed too much

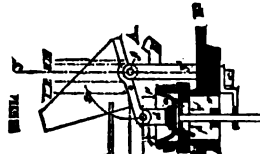
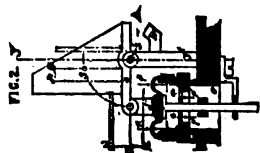
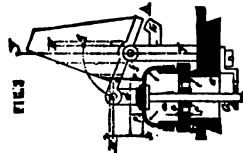
air to pass. He accordingly proposes to use the holes described in that patent fitted with valves with weighted levers inside the ventilator; preferring as a rule to place



them in the side space between the outside plate and the end of the shaft which projects into the interior of the ventilator. This is to let water out by its gravity, but to remain closed against air.

JOHN WALTER GIBBS, of 27 South John Street, Liverpool, in the county of Lancaster, ventilating engineer.
Prov. spec. October 29, 1883. Letters patented April 29, 1884. (Price 6d.)

4,599. A NEW OR IMPROVED VALVE FOR DETERMINING INTERMITTENT FLOW OF FLUIDS. Communicated from abroad by Alexander Kaiser, of Freiburg, Switzerland.



This invention relates to a construction of valve and its arrangement in a passage for fluid in such a manner that it determines an intermittent flow of the fluid.

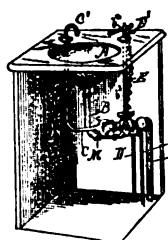
JOHN IMRAY, of No. 28 Southampton Buildings, Chancery Lane, in the county of Middlesex.
Prov. Spec. September 27, 1883. Letters patented March 22, 1884. (Price 8d.)

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

298,847. COMPOUND WATER-COCK AND SEWER-GAS CUT-OFF. WILLIAM CAHOON, JR., Chicago, Ill., assignor to Walter M. Keenan, same place. Filed June 29, 1883. (No model.) Issued May 13, 1884.



Claim.—1. The combination, with the waste-pipe and the hot and cold water pipes having suitable drop-valves or cocks for opening and closing the same, of a

conical valve for opening and closing the waste-pipe, and a rod having a crank for operating said waste-pipe valve, and a cam for operating said cocks in the water-pipes, so that said waste-pipe may be closed, except when said water-pipe valves are opened, substantially as specified.

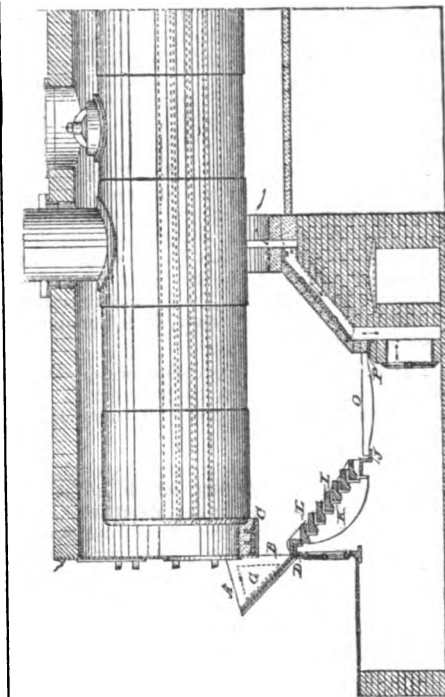
2. The combination, with the waste-pipe B, of the conical valve *b*, its seat-valve *b'*, handle *b''*, rod *b'''*, crank-arm *b''''*, link *b'''''*, cam *a*, secured to said rod *b'''*, water-pipe D, valve *d*, valve-seat *d'*, valve-stem *d''*, and button *d'''*, whereby said valve is operated by the cam *a*, substantially as specified.

3. The combination, with the waste-pipe B, of the conical valve *b*, its valve-seat *b'*, handle *b''*, rod *b'''*, crank-arm *b''''*, link *b'''''*, cam *a*, secured to said rod *b'''*, hot-water pipe D, and cold-water pipe D', each provided with valve *d*, valve-seat *d'*, valve-stem *d''*, and adjustable button *d'''*, whereby said valves *d* are operated by the cam *a*, substantially as specified.

4. The combination, with the waste-pipe B, hot and cold water pipes D and D', united together at C, water-pipe C, conical valve *b*, for closing the waste-pipe, and drop-valve *d*, for closing the hot and cold water pipes, mechanism for simultaneously operating the valve of said waste-pipe, and either said hot or cold water pipes, and a device for independently lifting the valve of either the hot or cold water pipes, so that both the hot and cold water may be allowed to flow at the same time and mingle together in the pipe C, substantially as specified.

5. The combination of the rod *b'''*, for operating the valve of the waste-pipe, with cam *a*, secured thereto, for simultaneously operating the valve of the water-pipe, substantially as specified.

298,880. BOILER-SETTING. WILLIAM T. HILDRUP, JR., Harrisburg, Pa. Filed September 26, 1883. (No model.) Issued May 13, 1884.



Claim.—The heating-flue box Q, constructed of cast-iron, open at the bottom, and provided with the foot R, and flanges *b*, for securing the box in place in the fire-bridge, and strengthened by the longitudinal and transverse ribs *a*, inclined from the centre outwardly, said flue-box being arranged within the fire-bridge, substantially as hereinbefore set forth.

298,292. FIRE-ESCAPE. CHARLES R. S. CURTIS, Quincy, Ill. Filed June 23, 1883. (No model.) Issued May 6, 1884.

BOOKS RECEIVED.

MINUTES OF PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS. Edited by James Forrest, Assoc. Inst. C. E., Secretary. Vol. LXXV.: The Northern Pacific Railroad, by G. B. Bruce; The New Eddystone Lighthouse, by W. T. Douglas; On Electrical Conductors, by W. H. Preece; On the Mining and Treatment of Gold Ores in the North of Japan, by R. J. Freceville; Discharge of Streams in Relation to Rainfall, New South Wales, by T. A. Coghlan; Timari Water-Supply, by A. D. Dobson; Reconstruction of the Bhim Tal Dam, Kumaon, N. W. P., India, by F. H. Ashurst; Pumping Hot Water, by H. J. Coles; On the Mechanical Examination and Testing of Portland Cement, by H. Faija; Spontaneous Combustion in Collieries, by Durand; Dredges and Dredging on the Tees, by J. Fowler; Some Particulars of an Artesian-Well Bored through the Oolitic Rocks at Bourne, Lincolnshire, in 1856, by J. Pilbrow; On the Theory of the Dynamo-Electric Machine, by R. J. E. Clausius; On the Practical Results Obtained from Various Water-Raising Machines in Holland, by G. Cuppair; The Foundations of the Alexander II. Bridge over the Neva, by W. Anderson; Abstract of Papers in Foreign Transactions and Periodicals.

MINUTES OF PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS. (London, 1884.) Edited by James Forrest, Assoc. Inst. C. E., Secretary. Vol. LXXVII.: Hydraulic Propulsion, by S. W. Barnaby; Wire-Gun Construction, by J. A. Longridge; Experiments on the Composition and Destructive Distillation of Coal, by W. Foster; On the Elevation, Storage, and Shipment of Grain, by W. Pilkinton; The New York, West Shore and Buffalo Railway, and the Methods used in its Construction, by P. C. Cowan, B. Sc.; Emery-Wheels and Emery-Wheel Machinery, by W. O. Roper; Constructional Iron-Work for Buildings, by R. Moreland; The Basic, Open-Hearth Steel Process, by T. Gillott (Appendix by J. O. Arnold); Experiments on the Transmission of Heat, by G. A. Hagemann; On Galvanic Action between Wrought-

Iron Cast Metals and various Steels during Long Exposure in Sea-Water, by T. Andrews; Comparative Value of Labor in Different Countries, by C. O. Burge; Water-Supply in some parts of Peru; and Probyn's Distilling Apparatus at Iquique, by C. M. Johnson; Obituary Notices; Abstracts of Papers in Foreign Transactions and Periodicals.

ON GALVANIC ACTION BETWEEN WROUGHT IRON CAST METALS, and Various Steels during Long Exposure in Sea-Water. By Thomas Andrews, F. R. S. E., Assoc. M. Inst. C. E.

DISTILLING APPARATUS AT IQUIQUE. By Charles Malcolm Johnson, R. N., Assoc. M. Inst. C. E.

ABSTRACT OF PAPERS IN FOREIGN TRANSACTIONS AND PERIODICALS. Excerpt Minutes of Proceedings of the Institution of Civil Engineers. Edited by James Forrest, Secretary.

REPORT ON THE WATER-SUPPLY OF THE CITY OF MOSCOW, with its bearings on the Fire-Service. By Engineer N. Servin, Commissioner of Moscow Water-Works.

ANNUAL REPORT (1884) BOARD OF WORKS FOR THE HACKNEY DISTRICT SURVEYOR'S DEPARTMENT. By James Lovegrove, Assoc. Memb. Inst. C. E., Chief Surveyor to the Board.

DIE LOKOMOTIV-FEUERBUCHSE FÜR RAUCHVERZEHRUNG UND BRENNSTOFF-ERSPARNISS, mit besonderer Berücksichtigung des Systems Nepilly. Beobachtungen, gesammelt von Johann Pechar, Direktor der k. k. pur. Dux-Bodenbacher Eisenbahn, etc.

SANITARY CONTROL OF THE FOOD-SUPPLY. By W. K. Newton, M. D., Health Officer of Paterson, N. J.

PREMIERE APPLICATION A PARIS EN 1881 DE L'ASSAINISSEMENT SUIVANT LE SYSTEME WARING. Par Ernest Pontzen, Ingenieur Civil. Paris, 1884.

THE WANDLE-VALLEY MAIN DRAINAGE. By William Santo Crimp, Assoc. M. Inst. C. E., F. G. S.

THE STATISTICAL NOMENCLATURE OF CAUSES OF DEATH. State Board of Health of New York (No. 65).

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *bs dwell*, brown-stone dwelling; *apart house*, apartment-house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

93d st, 100 e 9th av, 2-story br tens; cost ea, \$24,000; o, Robert McGinnis; a, Cleverdon & Putzel.

91st st n s, 70 e 4th av, 2-story and basement b s front dwells; cost ea, \$10,000; o, Susan Sullivan; a, J. Sullivan.

182 E 109th st, 4-story br ten and st; cost \$12,000; o and b, John W. Warner; a, Wm. Graul.

Lincoln av, w s 54 n Southern Boulevard, 4-story br factory with 1-story extension; cost, \$10,000; o, Annie Derleth; a, J. W. Cole; b, John Jordan.

BROOKLYN.

Pacific st, s s 100 w 6th av; Quincy st, s s w Ralph av, S 2d st, n s 153.6 w 5th st 3 (one on each street) 2-story br fire-engine houses; cost ea, \$9,500; o, Fire Department; a, Engineer of Construction.

Manhattan av, w s, 21 n 4th st, 2-story br st and ten; cost ea, \$7,000; o, a and c, Van Riper.

Gates av, s s, 21.6 e Franklin av, 3-story and basement b dwells; cost ea, \$7,500; o and b, James B. Alexander; a, A. Hill.

6th av, w s, 24 s Carroll st, 3 2-story basement and attic b s dwells; cost ea, \$6,000; o and m, Theodore P. Cooper; a and car, Martin & Lee.

Jefferson st, n s, 100 w Throop av, 3 2-story and basement b s dwells; cost ea, \$5,000; o and b, Wm. Reynolds; a, I. D. Reynolds.

Gates av, s e cor Franklin av, 4-story br flat; cost, \$14,000; o and b, James B. Alexander; a, A. Hill.

Meserole st, s s, 175 e Bushwick av, 4-story br beer-storage; cost, \$42,000; o, Otto Huber; a, C. Stoll; b, McQuade.

S. Oxford st, e s, 392.10 n Atlantic av, 3-story and cellar br and b s dwell, with extns; cost, \$12,000; o, Wm. Bradley; a, Parfitt Bros.

142-44 Halsey st, 2 3-story and bmt b s dwells; cost ea, \$7,000; o, John S. Frost.

10th st, n s, 20.9 w 4th av, 5 2-story and bmt br dwells; cost ea, \$4,000; o, Assip & Buckley; a, W. M. Coats.

Bedford av, w s, 80 n Ross st, 3-story and bmt b s dwell; cost, \$30,000; o, Joseph F. Knapp; a, Arthur Crooks; b, W. & T. Lamb, Jr., and Smith & Bell.

Clifton st, s s, 90 e Bedford av, 4 2½-story and bmt b s dwells; cost ea, \$4,000; o, E. T. Rider; a, Amn Hill; b, Wm. J. Rider.

ALTERATIONS, NEW YORK.

Broadway, w s, 21 s 53d st, 5-story br exten; cost \$8,000; o, Geo. H. Schastey & Co.; sup, Aug. Schastey 98th st, s s, 210 e 3d av, repairs, internal and external; cost, \$7,000; o, Richard Claffy; a, Elbert D. Howes.

513-515 W 56th st, build new chimney stack and fire-proof boiler-room; cost, \$10,000; o, Conrad Stein; a, J. Kastner.

126 E 37th st, 3-story br exten, also internal alterations; cost, \$1,000; o, J. W. Kilbreth; b, A. A. Andrews & Son and Christie & Dykes.

ALTERATIONS, BROOKLYN.

River st, w s, bet S 1st st and 2d st, add 1-story to a 1-story bldg; cost \$7,000; o, a and car, Brooklyn Sugar Refining Co.; m, S. J. Burrows.

AMHERST, MASS.—Agricultural library and chapel; cost, abt \$30,000; o, Amherst College; a, S. C. Earle; b, Bartlett Bros.

BRIDGEPORT, CONN.—Br armory; cost, \$40,000; o, State of Connecticut; a, Hill.

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NOTICE.—Correspondents will prevent needless delays and annoyance if they will address all communications, except those of a strictly private nature, to THE SANITARY ENGINEER. Checks should also be drawn to the same order.

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RIVER POLLUTION AND THE DUTY OF ENGINEERS.

As the riparian population along our large streams increases and becomes more and more educated to the necessity of prompt removal of filth from the dwelling and its vicinity, the pollution of the streams increases rapidly. They are made the receptacle for all objectionable matter, as this mode of getting rid of it is the cheapest and the most convenient. The inevitable result is to make the stream itself a nuisance, unbearable to the occupants of its banks below the point of discharge. The Mystic and the Passaic are even now in condition to strike hands with Father Thames and join in his heart-felt cry, as given in a striking cartoon and legend in *Punch*, "I wish I could run down to the sea and have a wash in the briny." There are innumerable smaller streams all over the country which have become offensive and dangerous, and are growing worse every day, but toward the purification of which no steps have been taken. The main reason of this neglect is the dread of the taxation which will follow the expenditure necessary to bring relief. In the immediate vicinity of New York there are several instances of the continuance of filthy nuisances, only because owners of property combine to defeat the carrying out of modes of relief authorized by law, but dependent for their execution on elected officials who dare not imperil their chances of re-election by doing their duty.

The day is near at hand, we believe, when laws will be enacted in New York and New Jersey which will compel officers to abate nuisances of this class, whether their constituents like it or not. In educating the law-makers up to the point of seeing the necessity for such action, and the people up to the point of acquiescence in complying promptly with such laws, the civil engineers who are called on to devise plans for sewerage towns have an important part to play. It is their duty not only to inform themselves thoroughly as to what has been done elsewhere in the way of the disposal of sewage, but to recommend in the most forcible manner in every case that some method of intercepting and purifying sewage-water be adopted, before the effluent is allowed to enter a stream, and to point out a method which will be practicable in the particular case at issue. Then, if the officials having the matter in charge refuse to entertain the idea of doing what is best, the next best plan can be recommended. But it is the imperative duty of a professional adviser of a non-professional board or committee to point out the right course first, and put himself on record as advising it, leaving it to his clients to take the responsibility of not doing the best thing. Committees, it is true, do not like to have plans proposed which they think will make them unpopular, but an engineer who has sufficient knowledge to advise on a plan ought to have enough independence to insist on stating the best plan first, and then, and not until then, any other plan which may be practicable and possibly may be the most expedient.

The publication of sound doctrine, even if it is not at first followed, will cause discussion and arouse the minds of men to consideration of the principles at issue, and this is always productive of good in the long run. Public sentiment is educated slowly, but it is pretty sure to come out right in the end.

CHOLERA INVESTIGATIONS IN INDIA.

THE English Government has appointed a commission to make investigations as to the cause and contagious character of cholera. Such at least is the ostensible purpose of the commission, but those who know something of the opinions and character of the gentlemen appointed are excusable for thinking that its real purpose is to prove that Dr. Koch is mistaken in supposing that his so-called "comma" bacillus has anything to do with the disease, and also to make a report in favor of the opinion that cholera is not contagious nor transportable by persons.

The Sanitary Commissioner for the Government of India, Dr. Cunningham, is strongly committed to the doctrine of the non-contagiousness and non-transportability of cholera, so much so that he rebukes his subordinates for reporting cases which seem to prove such transportability. We have before us a copy of the correspondence between the Government of India and the Government of Madras, in which Deputy Surgeon-General Furnell, Sanitary Commissioner of Madras, is formally rebuked for reporting the facts which seemed to prove that two outbreaks of cholera were due to importation. The reason for this rebuke is given in the following sentence: "There can be no doubt that the publication of such theories as are contained in this report is likely to prove most embarrassing, especially when the International Sanitary Boards at Constantinople and Alexandria not only eagerly accept these theories, but immediately proceed to put them into practice, to the great disadvantage of India." To this letter Dr. Furnell makes a very good reply, setting forth the reasons for his belief, and is informed in return that he "entirely fails to understand or appreciate the position taken by the Government of India and the Army Sanitary Commission with reference to this subject, and the duty of the Sanitary Department in connection therewith. What the Government of India have for years past been insisting upon is that their sanitary and civil officers of all grades, instead of wasting time in imperfectly tracing out doubtful connections of cholera contagion, should devote themselves to improving the health investigations under which the people live." In other words, you must not make any investigations which will throw any doubt on our theories, because our theories are best for the trade of India. The letters written to Dr. Furnell are very discreditable to the Sanitary Commissioner of India. Now, this Sanitary Commissioner is one of those appointed to make this investigation. He was sent to India a number of years ago to investigate the cause of cholera. He found out nothing, and it is easy to understand that both he and his colleague, Dr. Lewis, who was sent out for the same purpose, and who also found nothing, should feel rather sore over Dr. Koch's reports. Dr. Lewis has just published a letter to the effect that the comma bacillus is a common organism in the saliva, etc., and can have nothing to do with cholera, and Dr. Klein, who has been sent from London as a member of the commission, published a paper before he started to the effect that the comma bacillus is not specific, etc., etc.; in fact, some say that he was selected as a member of the commission because it was known that this was the ground he would take. We have nothing to say with regard to the

controversy about the supposed specificity of the comma bacillus, but it is no wonder that the doctrine of the non-portability and the non-contagiousness of cholera should meet with little acceptance if it is to depend upon the report of such a commission as this.

Meantime, it is well for those who argue on this subject to remember that the micro-organism which Koch suspects to be the cause of cholera is shaped rather like a minute parenthesis [)] than a comma; that some micro-organisms of this shape may be harmful and others not; that a pathogenetic organism does not always cause disease, and that the experience of the United States in regard to the portability of cholera is emphatically and decidedly in the affirmative, the commercial interests of India and those who think that their first duty is to uphold them to the contrary notwithstanding.

MATTERS of importance in theoretical and practical hygiene centre this week in St. Louis. On the 13th inst. the conference of State Boards of Health met at Liederkranz Hall, and on the following day the sessions of the American Public Health Association began, and will continue through to-morrow. At the same time the Executive Committee of the Master Plumbers' Association of the United States selected St. Louis during the session of the American Public Health Association as the place of a meeting, and began its session on the 15th. Our readers will be furnished in our following issues with reports of these gatherings from our special correspondents.

FEEDING MICE WITH PUTTY.

HAVING often noticed the white color of the dung of mice, as seen in buildings where the animals have little or no access to their usual forms of food, Professor Storer (*Bulletin Bussey Institution*, II., p. 264) followed the matter up, and found that the real source of the white mouse-dung is common painter's putty, which is used not only for cementing the glass of windows, but also for covering the heads of nails, and for stopping cracks and holes. This putty is made by mixing ground chalk (whiting) with linseed or fish oil, and it is the oil in the putty which attracts the mice and serves them as food. Professor Storer considers that the question of putty-eating must have a by no means unimportant bearing upon the health of the community wherever water-closets are fitted in the manner often adopted, by fastening the leaden trap into the iron soil-pipe by means of a putty-joint. He was informed by plumbers that mice do eat the putty from putty-joints, and that they cannot be prevented from doing so by mixing red-lead or white-lead with the putty. Professor Storer confined mice in a cage, and fed them with an insufficient supply of oats, and with as much putty as they could eat in addition. Day after day three mice thus confined eat ten or twelve putty-balls, three-eighths of an inch in diameter, besides their oats. To give figures—"besides their 3½ grammes of oats, the three mice ate daily during three consecutive days 12 balls of putty, weighing, all told, 20 grammes, and containing 16.7 grammes of whiting and 3.3 grammes of oil." That is to say, each of the mice swallowed every day and voided more than 5½ grammes of dry whiting. It is as if more than 50 pounds of dry chalk were to pass daily through a man of 150 pounds weight.

After the mice had become accustomed to eat large quantities of ordinary putty various other mixtures of pigments and oil were offered to them. The results of many experiments may be thus summarized: Of red-ochre mixed with oil, the mice ate a little at first, and then refused more. They refused putty made of three-fourths red-ochre and one-fourth whiting, but would eat, not very freely, putty made half and half. Yellow-ochre mixed with oil they refused at first, but were gradually brought to eat it by having fed to them putty containing more and more of the pigment. Powdered gypsum (with oil, of course) was eaten rather freely, plaster of Paris less freely, silica sparingly, and clay not at all unless mixed with whiting. Mixtures of oil with carbonate of baryta, carbonate of lead, carbonate of zinc, oxide of zinc, and slaked lime, all proved fatal to the mice, although in most cases the amount eaten was small.

Professor Crampe, of Proskaw, Silesia, found that the most effective of the poisons commonly employed for rats and mice was a paste made of precipitated carbonate of

baryta with three times its weight of barley-meal. Professor Storer finds that mice can eat much more than the fatal quantity of either carbonate of baryta or white-lead, provided they are mixed with whiting, the carbonate of lime seeming in some way to act as an antidote to the poison. He queries whether the protective influence of the lime-carbonate, or some other analogous compound, might not be put to practical use in the case of ordinary paints—whether it might not be possible to "adulterate" white-lead so as to diminish or do away with the colic of house-painters. "The application of this idea would be beset with technical difficulties, but it might be studied nevertheless."

OUR BRITISH CORRESPONDENCE.

Typhoid at Kidderminster—Social Science Congress at Birmingham—Health of Wandsworth—New Zealand Meats and Horse-Flesh—Telephonic Enterprises—Dr. Proust on the Cholera Epidemic—Padeham Reservoir—St. James' Park Nuisance.

LONDON, September 27, 1884.

THE typhoid epidemic at Kidderminster continues to increase. The Local Government Board has instituted an inquiry, the outcome of which is that the inspector, Dr. Parsons, has ordered the well from which the greater part of the water-supply is obtained to be closed. In the meantime water will be taken direct from a bore-hole until an increased supply is otherwise provided. This well is situated in the area of the sewage-pumping works within seventy or eighty feet from where the whole sewage of the borough is pumped. At the inquiry one doctor stated that the majority of his patient were teetotalers, which is an additional reason for at once remedying the bad water-supply of the borough. But there are no doubt serious defects in the sewer, etc., to account for the severe nature of the present epidemic.

The meeting of the Social Science Congress at Birmingham concluded last Wednesday. This was the twenty-eighth annual congress, and the third of the association held in Birmingham. The council reported that the attendance in the departments had been good, the business well conducted, and the discussions well regulated and of practical interest.

The Medical Officer of the Wandsworth district (an important and rising suburb of London, chiefly peopled by the working-class community) has just issued his twenty-eighth annual report, which is of a very satisfactory nature. It appears that the population of the district has increased 6.8 per 1,000 per year, and is now increasing at a higher ratio, but, notwithstanding this large increase, the death-rate has been reduced considerably, being now only 17.49 per 1,000, against 20.40 per 1,000 in 1851-60. The Medical Officer finds the water-supply of the district to be insufficient, being in point of fact less now than it was in 1881, when the population was smaller. There were 32,473 houses inspected in the district during the past year, and 47,283 feet were added to the drainage-system.

Considering the enormous quantity of frozen Australian and New Zealand meat which is weekly imported into England, it is rather remarkable that so little of it is seen exposed for sale. It leads one to believe that a good deal of it finds its way to our tables as English meat, and that it is sold at English fresh-meat prices. But that is better than having horse-flesh sold as beef, for doing which an Edinburgh butcher was, on Wednesday last, fined £15. I should add, however, in this case the penalty was larger on account of the 143 pounds of horse-flesh, meant for human consumption, found on the butcher's premises proving to be unsound.

Telephonic business over here is fast developing, though compared with telephonic enterprise in America it is as yet quite in its infancy. The post-office has recently withdrawn the restrictions which it previously placed on all telephone companies, with a result that the companies are getting more active. A telephonic-wire is being established between London and Brighton, and arrangements with regard to way-leaves are being made, so as to facilitate telephonic communication between London and Birmingham, Leeds, Liverpool, and Manchester. On Thursday night last preliminary experiments were tried in the Grosvenor Hotel, Victoria Station. The railway wire between London and Dover (77 miles) was used, and though this wire offers resistance, owing to the numerous block-signaling apparatus along its route, the voice of the speaker at Dover

was plainly heard in the Grosvenor Hotel. The United Telephone Company hopes in a week or so to complete the system between London and Brighton, so as to enable its subscribers in these two places to communicate with one another.

Dr. Proust, the Inspector-General of the French Sanitary Service, has recently presented his report on the cholera epidemic to the Minister of Commerce. He certifies that the epidemic in France is fast disappearing, and that its severity in the several places was always regulated by their sanitary condition. He states that the present outbreak has clearly shown the uselessness, if not the danger, of sanitary cordons and quarantine, and the necessity of sound hygienic measures. What Dr. Proust says with respect to France applies with greater force to Italy.

At Padeham a reservoir is to be built to catch the water from a drainage area of 440 acres from 800 to 1,500 feet above sea-level. It will cover 30 acres, and hold 100,000,000 gallons. The dam will be an earth embankment, 90 feet high at one point, with 15 feet top width, and slopes of three to one on both sides, and benches 15 to 20 feet wide on the slopes.

In view of the exceptionally hot season, and the steps generally taken to prevent fever, etc., one of the latest actions of the Office of Works is productive of considerable surprise. The water in the ornamental lake in St. James' Park has been run off, and men are employed, after several days' delay, in clearing out and carting away the slush and filth out of the basin. The smell of the decaying vegetable matter, etc., is most offensive, and, seeing that the park is a very favorite resort for an immense number of the children from the poor neighborhoods adjacent (not to speak of the better class who use it), and that these children, of course, delight in watching the proceedings, and, when possible, puddling about in the sludge, it is difficult to conceive a more unwise proceeding for the time of the year.

SAFETY-VALVE.

NOTES.

LET all who wish to help a noble charity send clothing, new or old, hats and shoes, to the Society for the Prevention of Cruelty to Children, 100 East Twenty-third Street, New York City.

DR. FRANK OGSTON, of Aberdeen, writes to the *British Medical Journal* that a case recently occurred in his practice where a pet canary caught the scarlet fever from children of the family, who were sick with the disease. Dr. Ogston points out that the case contains a caution that "our domestic pets may not only spread this disease by conveying the infected epidermal scales on their fur or feathers, but also by taking infection from their owners, and directly infecting individuals of the human species in their turn."

DIPHTHERIA is now prevailing in some parts of Reading, Pa., in virulent form. The Board of Health, to prevent its spread through the public schools, has passed a resolution of advice to parents. The board recommends that parents from the moment any of their children complain of sore throat until its true character be determined, or the same be entirely cured, withhold from the public schools all their other children; prevent as far as possible all communication between the child or children so affected, and that they use freely in the house chloride of lime or any one of the other best-known disinfectants.

THE anti-vaccination cranks who have raised an outcry against vaccination because, in a few cases, it is attended by bad results, should consider a letter in the *Civil and Military Gazette* from Dr. Neve, of the Mission Hospital in Cashmere, a country entirely unprotected from small-pox by vaccination: "It would be nearer the truth," writes Dr. Neve, "to say that the population is annihilated than to say that it is decimated by the scourge of small-pox." Small-pox is epidemic in every village and town of Cashmere. "I recently obtained from all my hospital staff a statement of the mortality from small-pox among their immediate relatives. They represent twenty-five families, and in these 190 members were born, of whom exactly 100 died of small-pox. Two or three children have not yet been attacked; all others have had the disease." Thus, of these 190 persons, at least 95 per cent. had been attacked by small-pox, and of these 55 per cent. succumbed. "There is not much room for hoping," Dr. Neve says, "that these figures indicate any very unusual rate of mortality; and, of course, the evils inflicted by the disease are life-long in many who survive the attack."

PEST-HOLES IN NEW YORK.

No. IV.

(Continued from page 433.)

OUR illustration this week is a view in the tenement-house No. 428 Water Street, New York, which is occupied by Italian laborers and rag-pickers. It is what is known to health officers and sanitarians as a "one hundred per cent. building," meaning that there is no yard or open

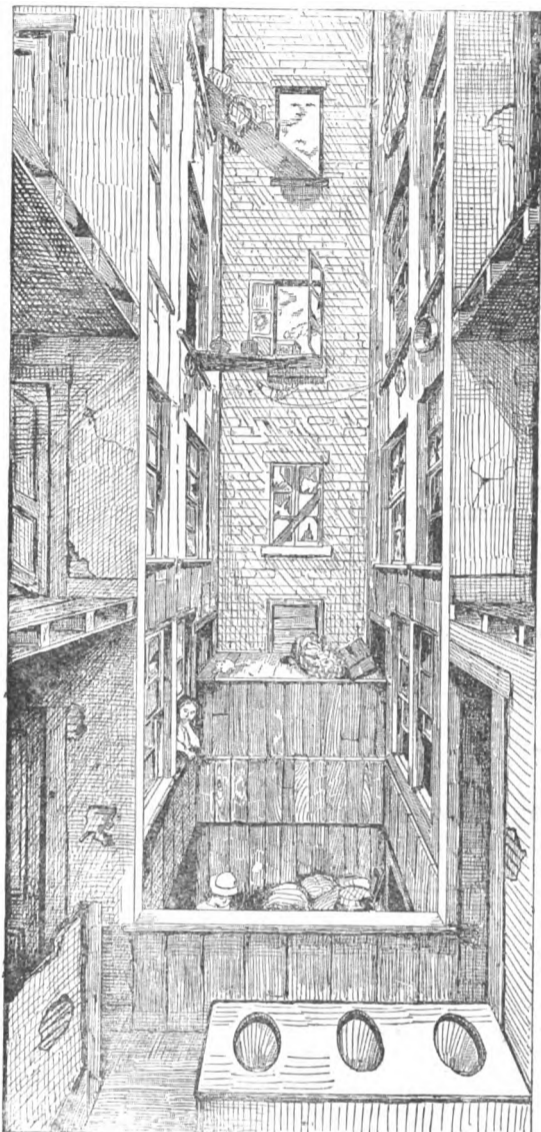


FIGURE 1.—WATER STREET TENEMENT.

courts, and that it covers the full percentage of the area of the building site. It is sixty feet long by twenty feet wide, and is five stories high, the outer walls being of brick, with all the other walls and the light-shaft of tumbled-down wood-work and laths and plaster.

By reference to the plan (Fig. 2) it will be seen there are three principal rooms to a floor, each of which is an "apartment," containing from six to nine persons—in all thirty-four adults and eighteen children in the house, though there are three unoccupied apartments. It will be noticed that two-thirds of all the rooms have to receive light and air through the shaft, and that but one line of rooms,

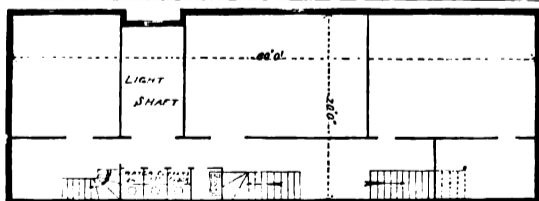


FIGURE 2.—PLAN.

the front, receives light through apertures in an outside wall. This shaft is not an air-shaft, as the roof and skylight cover it, and were it not for the broken windows no change of air would take place. At the bottom of the shaft is a cellar, in which the pickings of the street are stored and culled, and even some of the rooms are used for the storage of the results of many mornings' labor at the refuse-heaps and garbage-boxes of the city.

The sketch shows the light-shaft cut away at the side nearest the hall to give a view within it. Imagine this partition restored, with windows in it, and you have an idea of the position the privies occupy. The wood-work is

saturated with privy-filth, which leaks through the floor. Cleaning or cleanliness must be here long since a thing of the past. The stench of garbage, old bones, and rotten vegetables from the cellar, coupled with the sickening and deadly smells from the neglected privies, fills the light-shaft and halls, and, of course, the rooms opening on the shaft. In all rooms but one (the first as you go up-stairs), the halls, the walls of the light-shaft, the floors—indeed, nearly everything about the house—are frightfully dirty, all vestige of the original color of floors, walls, or ceilings having been long since obliterated, and all in a condition of dilapidation and dirt entirely out of the imagination of any one who has not visited such premises. A sink on the second floor is untrapped, the pipes are leaky, and old rubbish and barrels obstruct the halls, the roof is leaky, and ceilings have fallen down. In the hallways children are encountered with the last storm's street-mud dried to their bare feet, and with naturally dark skins, made darker by the dirt, one is apt to stumble over them in the gloom.

On the first floor, in what might be a store, was a heterogeneous gathering of boxes and bedding. It was occupied by many men, even in the daytime, who were apparently lodgers, some of whom were sleeping, some smoking, and all lounging in darkness and filth, the place reminding one of a kennel.

STEAM-FITTING AND STEAM-HEATING.

BY "THERMUS."

No. XLI.

(Continued from page 319.)

HORIZONTAL-BOILER SETTING.

THERE seems to be a decided difference of opinion among boiler-setters on the question of carrying the smoke-flue over the shells of boilers on its way to the chimney. Some are of the opinion that the heated gases of combustion, when they leave the tubes at the front head of the boiler, and after traversing them their entire length, should at this stage be allowed to escape into the chimney through a suitably constructed smoke-pipe or flue; while others claim that these gases are still so valuable for the heat they are supposed capable of imparting to the steam that they should be returned along the top of the shell of the boiler and in contact with it, for the purpose of superheating the steam.

When horizontal tubular-boilers are set with their back ends nearest the smoke-chimney, it is most convenient to take the flue which connects the "front-connection" to the chimney along the top of the brick-work, incorporating it into the walls or arch, often using a space left between the arch and the shell of the boiler for this purpose, though some builders interpose an arch between the flue and the boiler-shell, using the nearly triangular spaces formed by the arch and the side-walls (when the whole is covered with a flat top) for the smoke passages or flues.

When the chimney is nearest the front end of one of these boilers it is usual to make the shortest connection possible, with either iron or brick, dispensing with a flue over the shell, whether the constructor considers it to be a saving or not; generally making it only a matter of convenience.

Architects, in planning boiler-rooms for buildings, usually arrange to have their chimneys at the rear of boilers. This removes a hot smoke-pipe from the boiler-room. It gives them the chance (as many consider) to utilize the gases of combustion to their utmost, and it frequently happens that it is the most convenient position for it. The above outlines how the work is usually done and the considerations which lead to it, but the question with us is, should we return the gases of combustion over the top and against the shell of a boiler after they leave the tubes. The principal argument used in its favor, that the passage of the hot gases over the steam-space and in intimate contact with this part of the boiler-shell will superheat the steam, and consequently render the steam of more value, is apparently a correct one, and is undoubtedly believed by its advocates; but when carefully considered, it will generally prove to be a mistaken one.

In the first place it is impossible to superheat steam when it is in intimate contact with a large surface of water, as in the case of this class of boilers when comparatively slight differences of temperature exist. What might be done to a limited extent would be to evaporate particles of water carried mechanically against the boiler-shell, and to bring the steam more nearly into the state known as "dry steam" (steam at *maximum density*). But to be of any value in this respect the gases must have a temperature of many degrees above that of the steam in the boiler. If the pressure of the steam is 60 pounds and the temperature of the gases as they leave the front end of the tubes 350° Fah.,

they will add so little, if anything, to the heat of steam, which is already 308° Fah. (even if there is not a layer of flue-ashes overspreading the whole top of the boiler), that it is doubtful whether the loss of heat by radiation from the top of the boiler into the flue will not be greater than any gain there can be in the opposite direction, when we consider that all sides of the flue but one are cooling surfaces, and constantly passing heat to the outer atmosphere.

These are the conditions that may be assumed to exist when the heat of the gases of the flue are from 50° to 150° above the temperature of the steam.

But assuming the gases leave the tubes at 600° Fah., or nearly 300 degrees above the temperature of the steam, the question may then be asked, Will not the flue against the shell make a gain or a saving of heat? The answer will be, It may be a saving in heat; but will any engineer wish to expose the steam space of his boiler to 600 degrees of heat? Some may, on the theory that the steam in contact with water cannot be superheated, as it takes up water from the mass below when it passes the point of maximum saturation, and that consequently the temperature of the iron cannot be greater than the steam within it, as is the case at the underside of the boiler, where there is water against the plate. But practice does not carry this out. With great differences between the temperature of the gases within vertical flues and the steam at the other side of them the flues burn out very quickly. In like manner when the back head of a boiler above the water line is exposed, by having the "back-connection arch" too high, it cracks and shows the effect of overheating. In like manner will the top of a shell "show fire" when subjected to too great a heat, although there is steam inside of it. Again, steam goes down occasionally and leaves the top of the shell without a medium for carrying away the heat, or a strong fire is started to get up steam quickly, and the heat acts on the empty upper part of the shell, expanding it unduly on the top and straining the metal along the sides, just above what may be called a neutral line, and about where the side-walls close on the boiler, or perhaps a little nearer the water line.

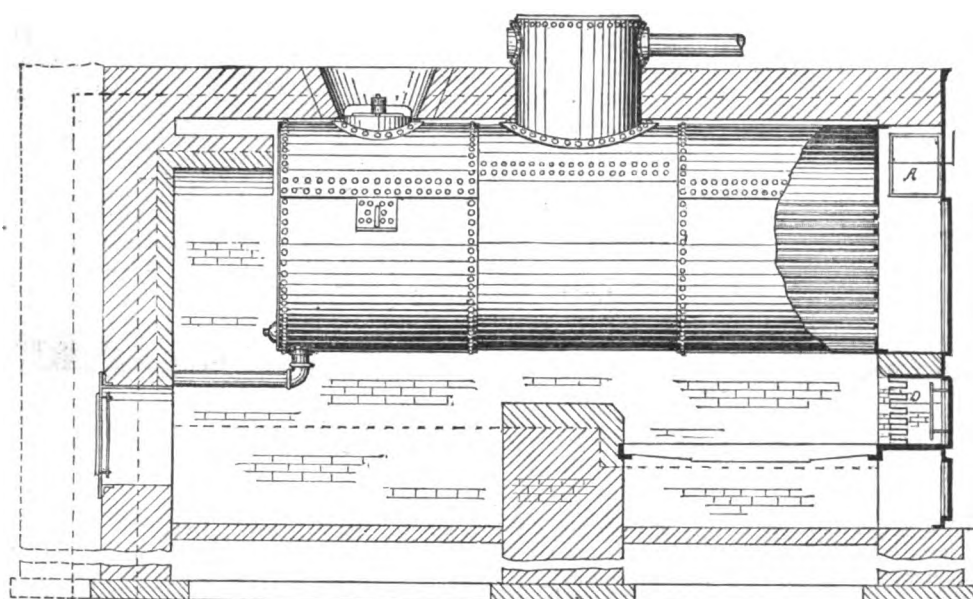
An allusion was made above to *flue-ashes* resting on the shells of boilers when the gases are carried along their tops. These ashes are the salvation of the boiler in more ways than one. When the temperatures of the flue-gases are too great they prevent the passage of heat to the iron. When they are too cold they prevent the passage of heat from the steam through the iron to the gases. They also prevent loss by radiation, and are, in fact, the neutralizing agent to our mismanagement or errors of judgment in this respect. But a danger lies in it for all that. Should there be a leak in a seam, or condensation from leaky tubes, or wet fuel, or from steam-blowers, these ashes leach and run down between the brick-work and the boiler and corrode the iron, and do it in a place that cannot be reached by the inspector.

It may be now asked, What is the remedy for all this, and when the gases of combustion leave the flues so much above the temperature of the steam as to suggest a waste, what is to be done? About the only answer that can be made to this is: Make the boilers of sufficient length to absorb the heat of combustion within the tubes and let the products of combustion escape to the chimney, at a temperature only that will be sufficient to properly maintain the heat within the chimney.

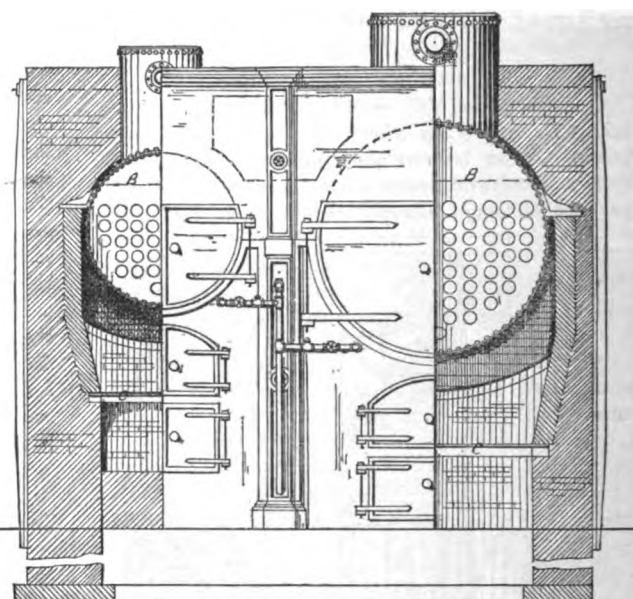
Again, with these flues, the thrust of their arch—as they are generally arched over the boiler—is against the side-walls, which, in time, with changes of temperature, forces the side-walls from the boiler. Little it may appear, but a crack one-half inch wide on each side of a 12-foot boiler makes a passage for heat equal to one square foot in area, and perhaps equal to one-half the chimney area for the same boiler. This makes a short cut for the gases from the furnace to the flue, reducing the value of the tubes in a proportion many times greater than that of the expected gain from such a flue.

Presumably enough has been said to show the fallacy of this class of flues and that the steam-space or surface of a boiler is not the place to evaporate water.

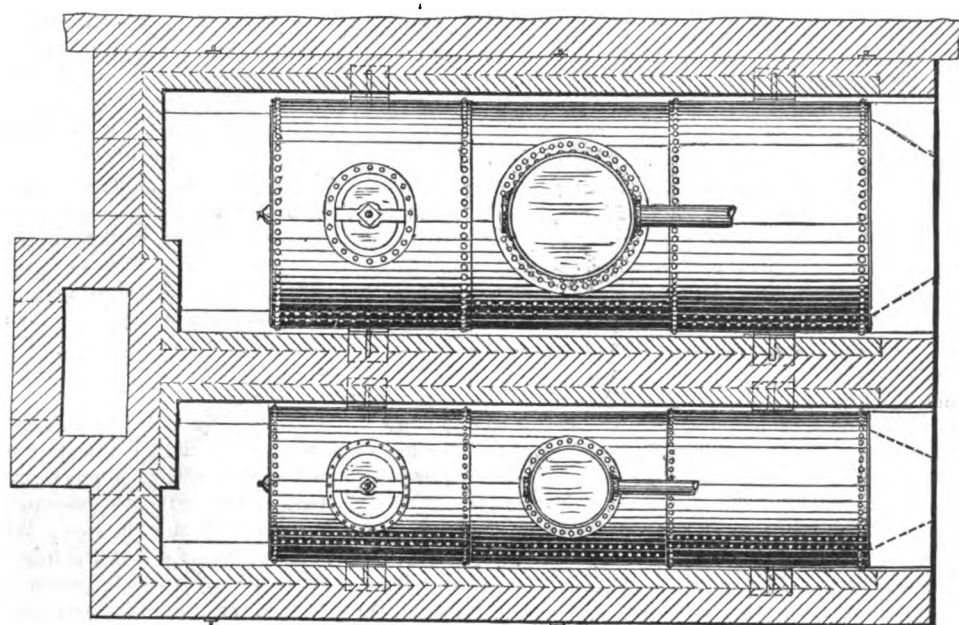
On page 169, current volume, in No. 39 of this series, is a sketch of the writer's method of constructing the flues over a boiler when it is necessary to reach the back end to make a connection with the chimney. This gives passages that may be cleaned from small doors in the front and rear, making a straight opening between any pair of doors, in one of which a light may be placed, and the flue viewed from the other end. A square flue also can be made along the top of one of the walls, or on middle walls between boilers if there are more than one, but this construction



LONGITUDINAL SECTION



FRONT



PLAN

BOILERS FOR "BERKSHIRE"

INDEX

- LARGE BOILER 12'x54"
 SMALL " 12'x36"
 A—DAMPER, LARGE BOILER 12'x24"
 B— " SMALL " 12'x18"
 GRATE, LARGE BOILER 4'x5'
 " SMALL " 3'x3.6"
 C—APPROXIMATE WATER LINE
 D—DEAD PLATE 20" FROM FRONT TO GRATE
 E—FLAME PLATE 15" WIDE

SCALE · IN · FEET ·

distributes the weight, and leaves a flat top, decklike, for the engineer or workmen on top of the boiler settings, and leaves no places to collect dust, or be receptacles for lumber or greasy waste to be a menace to the safety of the place from fire.

The illustration shows the setting of the boilers in the "Berkshire" apartment-house in this city. In this case an underground-flue was carried from the chimney to the rear of the boilers. To reach this flue a passage was constructed along the middle wall of the boilers, as shown by the dotted lines on the *front*, into which the smoke from both boilers drew, thence along and down at the rear, as shown on plan. The masonry at the outer corners is shown in the drawing as solid, which is not correct, the corners being hollow, and only built up for the purpose of giving a flat top to the masonry for the purposes before explained.

The smaller boiler of the two shown is for high-pressure use the year round, for running elevator, pumps, etc., and the large one is for warming purposes, and to be run at any pressure below fifty pounds per square inch the state of the weather may require, but withal it will be noticed they are set to have a common water-line that they may be run together, or that one may be made to do the work of the other.

(TO BE CONTINUED.)

ARCHITECTS, ENGINEERS, AND HEALTHY BUILDING.

MR. BERSEFORD-HOPE, M. P., President of the Art Section of the Social Science Congress at Birmingham, Eng., said in an address on the Strength and Weakness of Art:

"The architects of our generation must be more careful than their predecessors in insisting upon a rigid observance of the double moralities of architectural art, the morality of construction, and the morality of composition. The civil

engineers have come into the field as fierce competitors. If our architects desire to hold their righteous own against the competition of the engineers they must buckle to with all their might to master every detail of construction, even in portions of the building which never can be exposed to view, to master thoroughly the value as to strength and durability of all materials, to be familiar with all the laws of thrust and resistance, and to wield with an unerring judgment all the principles of sanitary science. The engineers must condescend to those principles of composition, of dignity in masses, of grace in details, which are the features which make a building delightful to an unscientific eye. The Thames Embankment is a gigantic and a magnificent work, but would it have been worse if the artist's hand had been more visible in the details, and particularly in the parapet? An ill-drained building produced by an able man must be weak, lamentably weak, in the trappings of whatever style it may be garnished. Therefore, the architect who works for truth and not for applause is bound to see that he does not purchase an outside artistic triumph, by playing with those issues of disease and death which follow on the neglect of nature's sanitary laws."

LEYTON SEWERAGE.

IN the Leyton, England, sewage-disposal system the sewage is led against one side of a large vertical wheel with flat spokes, and the other side grated, forming a sieve or strainer. The liquid matter flows through the sieve, the solids are retained, and as the wheel is revolved they are washed back from the grating by jets of water playing on its reverse side. Falling on the flat spokes, the solid matter drops to the centre as the wheel revolves, and is then lifted by an Archimedean screw to boxes, whence they are carted away. The strained liquid flows into vats, and is mixed with lime and black-ash waste by revolving arms operated by steam-engines. When thor-

oughly mixed the sewage flows into four settling-tanks, three of which are being filled while the fourth is being emptied. The effluent flows off at the top into a ditch between the tanks and an osier-bed. The sludge is removed weekly, and after draining in a "bed" or pile is squeezed into cakes, which are sold for manure. The effluent is very dark and unpleasant looking, but has no odor, although it leaves a black deposit in the ditch. The sewage of 30,000 people is treated in this way.

LANDLORDS, TENANTS, AND SANITARY MATTERS.—I am frequently consulted as to whether this or that house is healthy. My advice is always, "Do not take it unless the landlord agrees to comply with all the requirements of the local authority." The Croydon Local Board of Health instituted a plan in times past which is wisely followed by the corporation of our new borough. Any rate-payer wishing to have his house examined can have it inspected by the sanitary officers of the corporation, and a list of the defects which are discovered is sent, signed by the Medical Officer of Health, to the party who has obtained the inspection. I always advise those taking a house in this district to get the landlord to remedy all the indicated defects before he signs any agreement of any kind. After the defects have been remedied the local authority will grant a certificate as to the sanitary condition of the house, and no person should take a house unless the requirements of the local authority have been complied with, or the landlord will undertake to carry them out. It is astonishing to find how few houses exist which are able to stand such an inspection without very glaring defects being discovered. It is not sufficient to have such an inspection made once for all. It must be done periodically, for servants and ignorant workmen will put the best arrangement out of order, and the more perfect and ingeniously arranged any plan may be the easier it is put out of working order. Besides, the sewers and house-drains are so often laid in made ground, and so often alter their levels in consequence, that it becomes absolutely necessary that the underground part of the house-drain should be periodically looked at.—*Dr. Alfred Carpenter, Chairman of the Sanitary Institute of Great Britain, in London Times.*

THE INTERNATIONAL HEALTH EXHIBITION.

No. XXI.

(Continued from page 434.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

SANITARY WALLS.

ONE point which is well brought out at the International Health Exhibition is the increasing attention paid to interior wall-surfaces.

The use of white-glazed brick or tile commends itself on account of the light and cleanly appearance, not only in lavatories and bath-rooms, but also as a wall-covering in laundries and kitchens, in the setting of ranges, and in other situations. George Kent (exhibit No. 404) shows a model kitchen fitted up with various labor-saving contrivances, the walls covered with glazed tile. The various model dairies and bakeries in the exhibition are rendered attractive by the free use of the same material, and we can only wish that the use could be extended to the actual bakeries in which the bread in common use is prepared.

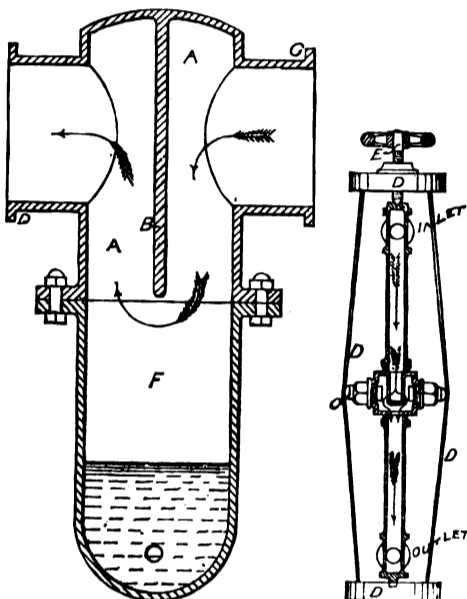


FIG. 1.

FIG. 2.

Among the exhibitors of glazed tiles and similar articles we may mention Doulton & Co., Lambeth, S. E., to whose general exhibit we have occasion to allude elsewhere; Joseph Cliff & Son (exhibit No. 409), 2 Wharf, King's Cross Goods Depot, N.; Wilcox & Co., Burmantofts (exhibit No. 410); Crystal Porcelain Pottery Company, 17 St. Bride Street, E. C. (exhibit No. 779); Craven, Dunnill & Co., Ironbridge, Shropshire.

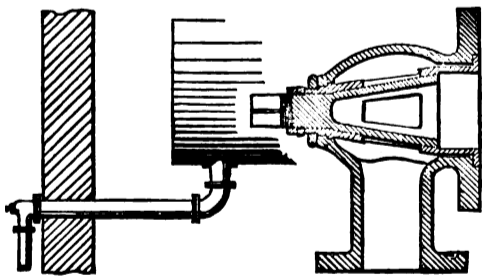


FIG. 3.

Besides the glazed tiles there are various other wall-coverings, more or less of a decorative character, which may be cleaned with water, or even with soap and water. We may mention among the exhibitors the Lincrusta and General Decorating Co., 184 Oxford Street (exhibit No. 913); Diespeker & Co., 40 Holborn Viaduct, E. C. (exhibit No. 803), who show specimens of mosaic-work for floors, dados, and walls, which affords a durable and non-absorbent surface; Thomas Hall, 8 George Street, Edinburgh (exhibit No. 853). The Millesden Waterproof Paper and Canvas Works, 34 Cannon Street, E. C. (No. 914), exhibits washable decorations, in addition to its rot-proof material for light out-door constructions; Jeffrey & Co., 64 Essex Road, Islington, N., exhibit wall-papers prepared by a process, the details of which are not given, but which are claimed to be washable with cold water.

The public has evidently been educated—perhaps over-educated—to the dangers of arsenic in wall-papers, and nearly all the exhibitors of paper-hangings lay stress upon the absence of arsenic or upon the “non-poisonous” character of the pigments employed. Among the exhibitors are William Woollams & Co., 110 High Street, W. (No. 860); Henry Carr, 21 Cedars Road, S. W. (No. 852); Heywood, Higginbottom, Smith & Co., 62 Walling Street, E. C. (No. 856); Jeffrey & Co., 64 Essex Road, N. (No. 859). Rottman, Strome & Co., 49 St. Mary's Axe, E. C., exhibit Japanese wall-paper, made of wood-fibre, “washable and non-poisonous.”

Just what is meant by the term “non-poisonous,” as applied to paints, we do not quite understand. In most cases it appears to mean free from white-lead and from arsenic, the two chief bugbears, but in one case we notice “non-poisonous white-lead”—composition not given. At any rate, great stress is laid on the “non-poisonous.” Thus the United Asbestos Company, 161 Queen Victoria Street, E. C., advertises that its paints are not only fire-proof, but also “free from all poisonous or noxious ingredients.” Among the exhibitors of the “non-poisonous” paints are John Hare & Co., 23 Fenchurch Street, E. C. (No. 849); Quirk, Barton & Co., 61 Gracechurch Street, E. C.; H. Thompson & Co., 95 Merrow Street, S. E. (No. 865); the Sanitary Paint Company, 34 Leadenhall Street, E. C. (No. 873); G. Botelberge & Cie, Melie, Belgium (No. 105, Belgium).

In connection with mural decoration and white-lead, we may mention several systems of dry-glazing. Messrs. W. & S. Deards, Harlow, Essex, exhibit the Victoria dry-glazing on the entrance porch in Exhibition Road, and some 6,000 square feet on the roofs of several of the buildings. The glass slides into tubes and is held fast by one screw and stop on the end of the tube. T. W. Helliwell, 8 Victoria Chambers, Westminster, exhibits a similar system. The glass is inserted in metal glazing-bars, to which a metal cap is secured by means of brass screws and nuts. Johnson Brothers, 6 Waterloo Place, Pall Mall, have furnished the dry-glazing of the water companies' pavilion. A channelled horizontal purlin stretches from rafter to rafter to carry the glazing bars, which are formed in two parts of zinc or copper. The top half slides into the lower half, forming an elastic spring, which allows the expansion and contraction of the glass while holding it firmly. We do not know that any sanitary significance is attached to these methods of doing away with the use of putty.

STEAM AND WATER FITTINGS.

In the exhibit of John J. Royle, of 71 Market Street, Manchester, appears “Royle's Patent Separator” for the removal of an excess of water from steam in its passage to the engine or elsewhere. It is composed of a chamber, A (Fig. 1), introduced into the steam-pipe, across which is a vertical septum, B, which hinders the direct passage of the steam and water through the pipe, causing them to change their course and pass downward, the direction given to the water or heavy particles being maintained, throwing them into the bottom of the chamber F, and below the draught influence of the steam, which turns under the septum and resumes its onward course.

The steam-trap shown in Fig. 2 drains the chamber and prevents the accumulation of water at its lower end. The principle of the traps is to take advantage of the difference of expansion between the sides of the frame D and the centre-tube when the latter is warmed by the passage of very hot water or steam. When the centre-tube expands the straps D D force the valves C to their seats, preventing a further passage of water or steam, and eventually finding a point in equilibrium where the opening of the valve-passages are nearly equal to the required passage of the water. By means of the screw E adjustment is secured.

Figure 3 shows a patent mud-cock in the same exhibit. The shell surrounding the plug and barrel is cast-iron. The plug and barrel themselves are steam-metal (brass), and are arranged so as to be removed from the shell for renewal or repairs. The cock should be applied as shown in the illustration, so the pressure within the boiler may tend to keep the plug to its bearing.

In the Water Companies' Pavilion, among the various stop-valves we noticed a form in use by several of the London water companies for making the connection between the main and the house-service supply. Reference to the drawing (Fig. 1) will show that it is nothing more than what is known in the trade as a back-pressure or check-valve. In the event of repairs being required to the house service, or should it be necessary for other reasons to cut off the supply, the blank cap C is unscrewed, and the short

plug P inserted above the spindle of the valve at A. The cap C is then replaced and screwed down tight, with the effect of bringing the valve V in close contact with the seating S and stopping the supply. A rubber washer, r, is placed above the valve V to prevent leakage when the cap C is removed. The washer r is of leather. It will be noticed that the main is provided with a boss, B, for the purpose of getting a longer thread for screwing in the valve.

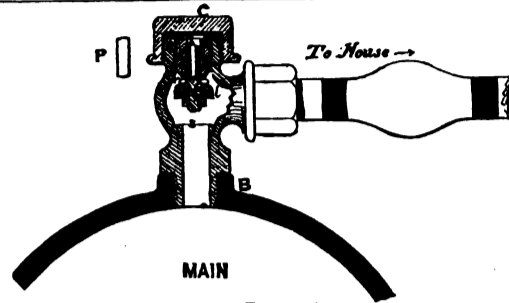


FIG. 4.

In Fig. 4, in the same pavilion, is shown one of the methods adopted by the West Middlesex Water-Works Company of connecting the house-service with the main. The iron casting A is bored and tapped to receive the valve V, which is similar to the one illustrated in Fig. 5, though, of course, the ordinary screwed ferrule may be substituted. A suitably-sized hole having been cut in the main with a diamond-pointed chisel, the casting A is placed in position

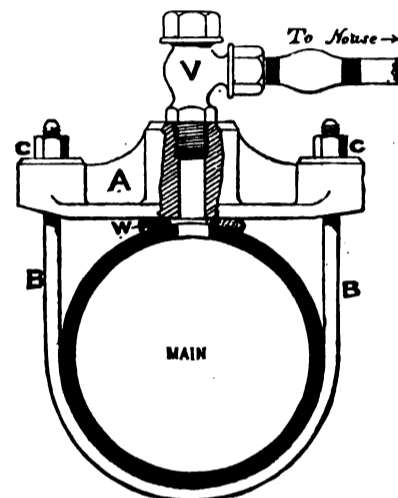


FIG. 5.

and secured by means of the U-shaped bolt B and nuts C', a thick washer of prepared felt or India rubber, or other suitable material, W, being interposed between the main and the casting to make the joint. The plan is expeditious and is said to be very durable.

(TO BE CONTINUED.)

IF press dispatches sent from New Haven, Conn., October 4 or 5, were correct, the owner of a tenement-house in that city ought to be held personally responsible for the narrow escape from death of eight persons in his tenement. The man had been warned that a hot-air furnace in this building was in dangerous condition, but paid no heed to the complaints, with the result that one night the smoke and gas from the furnace spread through the house and nearly asphyxiated the tenants, who were only saved by the timely arrival of a policeman. One of them was in so precarious a condition when rescued that the last rites of the church were administered to her. The owner of the building is also charged with brutal conduct toward the tenants, one of whom has brought suit against him for defamation of character. The account of the affair which has come under our notice states the landlord is to be arrested for criminal negligence.

DR. J. H. RAYMOND, the Health Commissioner of Brooklyn, has issued an order prohibiting the use of tin-washed copper vessels for soda and mineral waters. The use of vessels, pipes, faucets, and taps composed of copper, lead, or other poisonous substance, is also prohibited, unless so protected that the soda or mineral water or syrup shall not come in contact with the metal.

A PLUMBER named James Monroe was asphyxiated a few days ago while tapping a gas-main in a trench at Saratoga. He inhaled so much gas that he fell forward unconscious on the pipe. A physician, who was passing by, was just in time to restore him to consciousness.

PETTENKOFER ON CHOLERA.

DR. MAX VON PETTENKOFER, the Professor of Hygiene at Munich, has some peculiar views as to the origin and propagation of cholera, and has summed these up in a series of articles in a Munich newspaper, which are intended to encourage the inhabitants of that city, and to advise them what to do in view of the danger of the appearance of the disease in Europe. A summary of this paper is given by Professor de Chaumont in the *Sanitary Record*, and from this we select the following extracts, as being of universal application no matter what theory may be held as to the cause of the disease:

"Although the origin of cholera is still very obscure in some points, investigation has nevertheless established certain fundamental facts that do not admit of doubt. Cholera in its epidemic form does not depend solely upon a disease poison (or, as we may say, upon a yet undiscovered cholera organism), which is conveyed through human intercourse, but also upon the receptiveness of the locality to which this cholera germ is brought. There are places, and even large cities, which have always successfully withstood the epidemic influence of cholera, even although individual cases have been from time to time introduced. We may cite as examples in our own near neighborhood the cities of Stuttgart, Salzburg, Innsbruck, etc.; and in France, Lyons and Versailles. Such places are said to enjoy immunity from cholera. But even places which do not enjoy complete immunity may do so at certain times; that is, they are not always victims of a cholera invasion when such invasion is possible. Munich, for example, has suffered only three times from cholera since the disease became known in Europe—viz., in 1836-7, 1854, and 1873-4—whereas Berlin has suffered on every occasion. There is also not only a local but a seasonal susceptibility for cholera as well. * * * That the cholera germ need not necessarily become active at once, when it is sown in a locality, we had good occasion to see in the visitation at Munich itself in 1873, when the epidemic was divided into two parts, a summer and a winter outbreak. Munich lies on three terraces on the left bank of the Isar. The summer outbreak was almost entirely limited to the two higher terraces, while in the lowest there were at most a few sporadic cases. The summer outbreak, like that of 1854, showed itself in the beginning of August with a few cases, but it disappeared entirely toward the end of October, to reappear again with greater severity in November, when the district which suffered most was the lowest lying terrace which the winter outbreak had spared. If, however, we admit, as indeed we must, that the disease arose from intercourse between Vienna and Munich, then the cholera germ must have been introduced from the upper to the lowest terrace in August, and from the Turkish barracks* to the Isar barracks, where the disease appeared for the first time in November, after a lapse of three months. * * * We in Munich are, I think, entitled to regard the further development of cholera in Egypt, and even, it may be, in Southern Europe, with equanimity, and that on several grounds. The history of cholera teaches us that it has never yet reached Bavaria suddenly, without stages of outbreak on the way. In 1865, when it was so severe on the shores of the Mediterranean, it never reached Munich. Since then our local hygienic arrangements have been greatly improved. These improvements date from the experiences which we obtained in the epidemic of 1852, which was also an exhibition year, and they had a very favorable influence in modifying the invasion of 1873-74. In 1836-37 there died, out of 84,734 inhabitants, 802 persons, equal to 0.94 per cent.; in 1854 there died 2,223 out of a population of 106,715, or 2.08 per cent.; and in 1873-74, when we had two outbreaks, a summer and a winter one, there were 1,466 deaths out of 186,000 inhabitants, or 0.71 per cent. The new water-service in Munich is excellent, both as to quantity and quality, and the delivery to individual houses is now completed. Our drainage system advances rather slowly, but steadily, and the local authorities will doubtless take steps to accelerate it.

"As things are at present, even if Munich were without water-supply and drainage, it would not be likely at present to suffer from cholera, for the moisture of the soil, which can be best measured by the ground-water, is at present as high as in 1866, when Munich was threatened by numerous epidemics in Germany and Austro-Hungary, and when the disease was much nearer us than at present. In that year of war there doubtless came to Munich many cholera germs by the medium both of persons and of all other possible things from cholera localities at no great distance. The police-surgeon noted in his journal only nine cases, of which two were fatal, but the city, as a whole, remained free from cholera. Unless we have this year in the coming autumn and winter a long-continued drought, we need have no fear of cholera next year. * * * And even should it attack us, in spite of everything, we must ever strive to provide it with a less and less favorable soil, and we may then hope that it will pass over us more mildly than before, as experience seems to teach that it will. Let us not, at any rate, insist upon the contagionistic standpoint, which looks upon the unfortunate cholera patient as the infected centre! We shall tend him as before, so that the poor may easily obtain medical help and attention, but we will not shun him. Neither will we tear the well-to-do patient from the bosom of his family; his friends may attend upon him with all love and without any fear, seeing that there is not the slightest danger for them. We may certainly run a

risk of being infected in the same place in which the patient became infected, but not from the patient as such. * * * Port writes on this subject in his report to the Cholera Commissioner for the German Empire, 'On the Cholera Epidemic of 1873-74 in the Garrison of Munich, and on the Influence of the Military Hospital during the Epidemic,' in the following manner: 'That cholera patients are not dangerous to their attendants has been proved in this epidemic in the Military Hospital, where not a single attendant has even suffered from the slightest choleraic diarrhoea. We cannot ascribe this, however, to the disinfection of every drop of the patient's evacuations. The evacuations are so bulky and so rapidly discharged that to deal with them effectually is impossible; they pour over the bed, the bedding, the clothes of the attendants, and, even if they could be generally quickly removed from the two former, they remain more or less long on the attendants' clothes, seeing that a more frequent change of clothes is either impossible or inconvenient. The following example may be cited in illustration. A cholera patient had so flooded his bed that he might have been said to be swimming in his rice-water stools. In order to give him dry bedding an attendant lifted him up in his arms, while another rapidly drew out the wet bedding and put dry in its place. In the short interval the patient evacuated in the arms of the attendant several litres of liquid, which ran down over the arms, trousers, stockings, and slippers of the attendant. Some hours later the attendant was again seen in the same clothing—the dejections had dried on his body and must have been scattered about in dust by his moving about, and must have been breathed both by the attendant himself, and by others, but no case of cholera resulted. Such incidents, more or less modified, are of frequent occurrence in a cholera hospital.' These facts may be cited, in order to counteract the terrifying contagionist notions, which are only too apt to make the attendance more than ever difficult. Let us, therefore, not shun those who are ill with cholera, but let us strive to render our soil in Munich less favorable for disease-poison, and less receptive of cholera germs; but it must not be done when cholera has broken out among us—it must be done beforehand and at once.

"Finally, every one can do much for himself and his family when an outbreak does take place. To be the victim of an attack of cholera it does not suffice that the cholera infection should be prepared, and that there should be the required tropical and seasonal tendency, but there must also be the individual susceptibility. In one house there may be twenty or more persons exposed to the same infecting influence, but as a rule only one or two will take cholera. Experience has shown that the greatest influence is exercised by age, robustness, food, bodily and mental strain, clothing, cleanliness, etc. * * * One most important point is to avoid everything that tends to produce looseness of the bowels, the causes of which may vary with the individual. Nothing is so effectual in checking a cholera epidemic as careful attention to the state of the bowels, and medical assistance should be obtained as soon as the slightest premonitory diarrhoea shows itself. It is a great mistake to say that medical assistance is useless, and that because fifty per cent. of cases on an average die, it is immaterial what we do. This is only true for cases which take on immediately the extreme algid form, in which case little can be done; but against the beginnings of the disease, against diarrhoea and cholera, medical treatment is not powerless, but, on the contrary, most promising. Medical treatment of premonitory diarrhoea is one of the most important prophylactic measures against the development of the severe and dangerous form of the disease."

BORAX AS A DISINFECTANT, INTERNALLY.

THE *Comptes Rendus* of the French Academy of Sciences for July 21, 1884, contains a communication from M. E. de Cyon, relating to the antiseptic properties of borax.

In a previous address, in 1878, M. de Cyon made known the result of his researches, which, while fully confirming the prior observations of Dumas as to the great antiseptic properties of borax, demonstrated the perfect harmlessness of this substance. Fifteen grammes and more per day may be introduced into the system without causing the slightest trouble.

During these last six years M. de Cyon has been able to examine the excellent properties of borax and boric-acid in all diseases produced by parasites and microbes. It is a grave mistake to judge of the efficiency of a disinfectant by the toxic effects it may have on the human system. Some antiseptics, regarded as infallible on account of the dangerous effect which their use would have on the human body, are perfectly useless against an invisible parasite, which, however, succumbs to a few grains of borax or boric-acid.

M. de Cyon feels justified in urging a trial of this powerful preserving agent in case of an epidemic. Taken in doses of five or six grammes per day the borax will exert a direct action on the microbes in the intestines, and, moreover, passing into the blood, could reach there the bacilli which might have penetrated there.

M. de Cyon remarks that what has rendered well-nigh useless the ordinary means of disinfection is that their action is naturally limited to exterior parts of the body. It is only when the disease is fully established that the physician resorts to internal disinfectants, and then it is often too late.

In summing up, M. de Cyon recommends, on the one hand, the use of borax or boric-acid in solution for external application as a wash; on the other, the addition to food and drink of about six grammes of borax per twenty-four hours.

WORK OF THE SOMERSET HOUSE LABORATORY.

THE Principal of the Laboratory at Somerset House, London (Dr. Bell), in his annual report, states that during the year ending March 31, 1884, the number of samples examined in the laboratory was 26,550, being 349 more than the highest number ever examined in one year.

Fifty-one samples were referred to this laboratory under the English Sale of Food and Drugs Act, as against 30 samples last year. They comprised milk, butter, bread, coffee, mustard, ginger, oatmeal, rum, whiskey, tincture of quinine, and carbonate of magnesia.

In 34 cases the official analysts confirmed, and in 17 disagreed with, the conclusions of the public analysts. Of these 33 had reference to milk, and in 8 instances the Inland Revenue chemists disagreed with the original reports.

In three cases out of seven, in which the microscope was the principal means of detecting adulteration, the Somerset House chemists were unable to confirm the public analyst. They comprised 1 sample of coffee, alleged to be adulterated with chicory, and 2 of mustard, each of which was said to contain 12 per cent. of wheat flour.

In the case of "magnesia," the public analyst found that it consisted of about two-thirds carbonate and one-third oxide of magnesia. These results, Dr. Bell says, were practically confirmed by us. The analyst held, however, that this sample ought not to have been sold for light magnesia, as its effects as a medicine were different. In giving our certificate, we considered it proper to call the attention of the justices to the synonyms of carbonate of magnesia and magnesia, and the similarity of the physiological effects ascribed to them by various accepted authorities.

Of tincture of quinine, the public analyst reported that it contained only 6.2 grains of sulphate of quinine per ounce. Defendant's analyst stated that it contained 7.44 grains, and that about one-half grain was lost in the analysis. The full amount according to the formula—8 grains per ounce—was found by us.

Four samples of spirits had all reference to excessive dilution with water, and, with one exception, the results of the public analysts were confirmed.

A sample of butter, said to consist mostly of foreign fat, was found to be genuine, and a sample of bread, alleged to contain alum, was found to be free from that substance.

The bulk of the chemical work at Somerset House is done for the Customs and Inland Revenue, including last year 6,640 samples of beer wort, 105 of tobacco, 929 of "compounds," liquors, and wines, 527 spirits, a number of essences, teetotal beverages, sweet spirits of nitre, peptonized beef and malt wine, Khoosh bitters, menthol cones, chlorodyne, cough balsam and other miscellaneous articles. For the Admiralty 113 samples were analyzed, ranging from butter to German silver. Special attention was directed to the enamel linings of cooking-utensils, which in many cases were found to contain dangerous quantities of lead and arsenic. For the Board of Trade 740 samples of lemon and lime juice were analyzed. Of these 13 per cent. of the lemon and 6 per cent. of the lime juice samples had to be rejected, and the improvement noted last year had not been maintained. For the India Office 684 general samples and 440 beers were analyzed, and for the Stationery Office 14 samples of sealing-wax and ink were examined. The sealing-wax was in every case inferior to the contract sample. The ink was found to have been prepared from proper materials, but not in accordance with the contract sample.

The Customs and Inland Revenue have undertaken 39 prosecutions on the analytical reports, and obtained convictions in every case. The annual inspection of the tobacco manufactories of the United Kingdom by the analysts of the department resulted in the detection of one manufacturer in Ireland using gum, and another using magnesia salts. On the whole, it would not appear from this report that commercial morality is of flourishing growth.—*The Chemist and Druggist*.

SUGAR IN MILK.

M. PAUL BERT, the eminent French biologist, has been investigating the origin of sugar in milk. Two theories exist explaining this phenomenon, one of which supposes

* The name of barracks in Munich, built in former days by Turkish prisoners. (Translator.)

that it is formed in the gland itself from lactogenic or milk-forming matter; the other supposes that it comes from the blood, and is merely stored in the breasts of animals. M. Bert has experimented with cows and she-goats, and found beyond a doubt that sugar of milk is introduced by excretion in the breasts from sugar formed in excess by the animal. The sugar is apparently first formed in the liver, but whether it appears in the form of lactose, or glycose, afterward transformed into lactose in the breasts, is yet a moot point which M. Bert has not investigated.—*The Analyst*.

OPIUM ASSAY.

MR. W. W. BARTLETT has assayed three samples of opium by the processes laid down in the United States, the German, and the British pharmacopœias, and his results, embodied in a paper, were brought before the Pharmaceutical Association recently. He found that the process of the United States Pharmacopœia, which calls for 12 per cent. of morphine, gave with the three samples, 12.50 per cent., 12.48 per cent., and 13.40 per cent. of morphine. The German process, which calls for 10 per cent. of morphine, gave 8.50, 10.50, and 9.25 per cent. respectively. The process of the British Pharmacopœia calls for at least 6 per cent. of morphine, and the samples gave 5.12, 8.25, and 3.42 per cent.

WROUGHT-IRON WATER-PIPE.

A PAPER recently read by Mr. Hamilton Smith, Jr., before the American Society of Civil Engineers, in connection with the discussion which followed, brings together many interesting details with reference to the use of wrought-iron pipe for conveying water under high pressures—a use which is quite common in the western part of the United States.

In the construction of the North Bloomfield tunnel in California, water, to furnish power, was brought in a wrought-iron pipe, which, with its branches, had an aggregate length of 12,460 feet. The pipe-main was laid with its penstock 285 feet vertical above the surface at the upper shaft and 549 feet above the lowest shaft. It was made of single-ripped sheet-iron of No. 14 (Birmingham) gauge, in lengths of 20 feet, put together stove-pipe fashion, with the joints made tight by strips of tarred cloth and pine wedges. The pipe had a diameter of 15 inches at the penstock, diminishing from this to 13, 11, and 7 inches at the lower end. The pipe was laid on the surface of the ground, its only protection being in places a couple of 1½-inch planks tacked together and placed over it. The entire leakage probably did not amount to more than three or four cubic feet per minute, and at the end of two and a half years time it was in perfect order.

At the Idaho Gold-Quartz Mine, near Grass Valley, California, the supply-main is of wrought-iron, 22 inches in diameter, 8,764 feet long, and buried below the frost line. The pipe is thoroughly coated with asphalt. The long seams are double-ripped; the round seams are single-ripped. At the lower end the iron is No. 6 gauge. The water is delivered under an effective head of 523 feet.

The Spring Valley Mine, at Cherokee, Cal., was laid in 1871. The pipe is 13,000 feet long, 30 inches in diameter, with a maximum pressure of 887 feet below the hydraulic grade line; at this point the iron is three-eighths of an inch thick, double-ripped. After fourteen years' service the pipe is still in good condition, although where the pressure does not exceed 180 feet the iron is only one-twelfth of an inch thick.

San Francisco has been for years supplied by water brought in wrought-iron pipes, and at present the supply is being increased from the Calaveras water-shed, using a wrought-iron pipe twenty-four miles long, five feet in diameter, under a pressure of 500 feet vertical.

When properly coated with asphalt the wrought-iron pipes seem proof against rust, and the sand and gravel carried by the water has not been found to cut through the pipes, as might perhaps be expected.

BROOKLYN is expending \$30,000 in filling up low lots and ponds in the Twelfth Ward.

THE Pittsburg, Pa., Board of Health recommends the contract system for the removal of garbage, which has now become a nuisance in the city.

THE Canadian Department of Agriculture has ordered a rigid inspection of American cattle brought into the Dominion on account of reports that pleuro-pneumonia is prevailing in Illinois.

Correspondence.

BY-PASSES IN TRAP-VENTILATION.

NEW YORK, September 27, 1884.

To the Editor of THE SANITARY ENGINEER:

FROM the frequent occurrence of by-passes, both in new and old work, it seems desirable that more publicity should be given to the subject than has heretofore been done. It seems hardly necessary to point out the objections to "by-passes" from a sanitary point of view, when it is stated that a "by-pass" is an arrangement of traps and air-pipes by which sewer-air passes around the trap and so out into the building, thus practically making of no avail the many other precautionary measures, such as tight joints, etc., taken to prevent its entrance into the dwellings. One

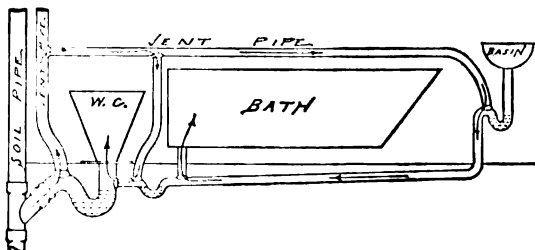


FIG. 1.

simple rule, if followed, will prevent a by-pass of the ordinary type, such as will hereafter be described. Water should never pass through more than one trap in reaching the house-drain. If water, after passing through the trap of its own fixture, then passes through the trap of another fixture, and both traps are ventilated, there is sure to be a by-pass. One style of by-pass is shown at Fig. 1. Here the water from the basin, in reaching the house-drain, passes through three traps, and the result is a double by-pass—one around the bath-trap and one around the water-closet trap. As a

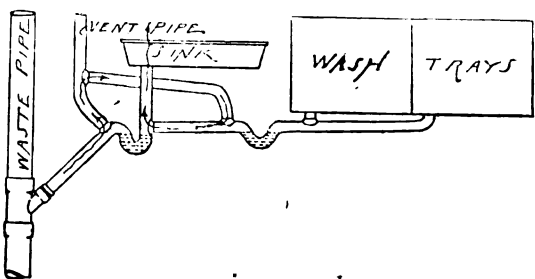


FIG. 2.

rule there will be as many by-passes less one as there are traps through which one discharge has to pass in reaching the house-drain. If Fig. 3 be examined closely it will be seen that the water from basin 2 does not pass completely through the trap of basin 1, but enters it just below the seal. In this case the danger is not so imminent as in the others; that is, the water, to make a complete by-pass, must pass entirely through the second trap. If it only passes half through—i. e., enters it at its lowest point—the arrangement is not so dangerous. The greatest care should be exercised in overhauling old work. It is very common to hear the advice given, "Well, trap that basin and venti-

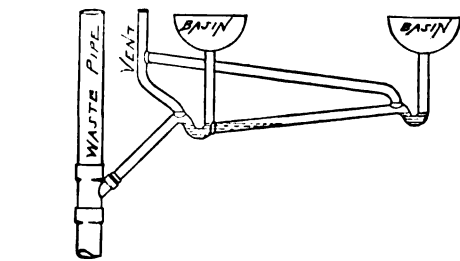


FIG. 3.

late it." In nine cases out of ten it is the worst thing that could be done, if nothing more is done. In almost every case in old work when the fixture is not already trapped, and often when it is, the trap of some other fixture will upon examination be found to act for it. The writer has one case in mind in which one water-closet trap answered for eight fixtures. A trap or vent-pipe should never be ordered for any fixture in an old house, without first tracing the branch waste-pipe and seeing that it does not connect with the trap of any fixture.

Respectfully,

L. M. HOOPER.

PLUMBING IN ENGLAND.

LONDON, ENG., September 18, 1884.

To the Editor of THE SANITARY ENGINEER:

THE plumber of to-day has a greater responsibility thrown upon him than fell to the lot of his ancestors, for he is held responsible for the sanitary condition of our homes. There are numbers of men who have progressed with the times; there are a great many who have not, saying they do not believe in new-fangled notions, and some architects have been heard to make the same remark. It is a well-known fact that very few architects in England take an interest in domestic sanitation, and plumbers, as a rule, cannot go beyond their instructions—i. e., with regard to new buildings. The result is that a new profession has sprung up—that of sanitary engineers. There need be no regrets about this, so long as these men make a proper study of the science. Civil engineers will be found to be the most trustworthy on this point, those who devote themselves especially to this subject; and although the names of a few plumbers could be mentioned who are very much in advance of the profession in arranging work inside of houses, still the body of the trade has not made the progress that it should have done. This is much to be regretted, as who has more experience in a trade than the actual worker? And if he made proper use of his knowledge, who is more capable of giving advice? If all master plumbers had been workmen themselves there would not be such an array of people posing before the public as advisers, who know very little of what they talk about, and a great many of whom should be prosecuted as impostors.

The writer was recently sent to seek for the cause of a smell in a gentleman's house, as there was illness among the inmates. On arriving he was told that an only son had just died of diphtheria, and the life of a daughter was almost despaired of. The gentleman said it could not be the drains, as he had paid good fees to a professional adviser, and large sums to a builder for alterations to them and the plumbing-work of the house; but, on testing them, they were found to be defective in all directions, and in one case a putty-joint was made in a ventilation-pipe from the drain, and was within six inches of the pillow on which the head of one of these children laid each night. Any one who saw the father's sorrow and the poor heartbroken mother's face would have felt that it was a great pity the law could not touch these people, who, by their imperfect knowledge, had led to this trouble.

A great many plumbers in small towns and outlying districts have not the opportunity for improving their sanitary knowledge that city men have, yet they are often called upon to do something in connection with it. It is to be wished that your paper will reach all such, as it always includes something that may be of use to them, or a means for giving advice when asked for. To master plumbers and first-class men, THE SANITARY ENGINEER is simply invaluable, containing, as it does, news appertaining to the trade from all parts. Every number includes something that is interesting, and for a small sum information is given which could not be had by any other means. The writer has sometimes given a good price for a large book which did not give him such important advice as one number of your paper. I find in it the latest news, whereas a good many books published two or three years ago are already behind the times. As a practical plumber, I beg to subscribe myself as one who from its pages has learned a great many WRINKLES.

EXHIBITION OF FILTERS.

22 NEW OXFORD STREET, LONDON, W. C., }
August 27, 1884.

To the Editor of THE SANITARY ENGINEER:

IN your issue of September 11, No. 15, you comment on the not very satisfactory way in which we have attempted to exhibit at the Health Exhibition models of spongy-iron filters at the Antwerp water-works. It is stated in a recent report to the Frankfort Society of Health Technics that the exhibition is anything rather than a health exhibition. This is the explanation of our shortcomings. So much space was required for show purposes to make the exhibition attractive to the millions of visitors that even our modest demand for space was curtailed to such an extent as scarcely to leave enough for the display of a few domestic filters. We do not, however, mean this to go forth as a reproach to the committee. To make children swallow pills you cover them with sugar, and to make grown-up people look at filters and drains you must relieve them by Chinese and Japanese curiosities, which every physician would condemn, and by gorgeous insanitary dresses, sweetened by the usual display of music and fire-works, not to forget tempting indigestible eatables. We remain, sir, your most obedient servants,

THE SPONGY-IRON FILTER COMPANY.

PAINT FOR TANK-LININGS.

PHILADELPHIA, September 30, 1884.

To the Editor of THE SANITARY ENGINEER:

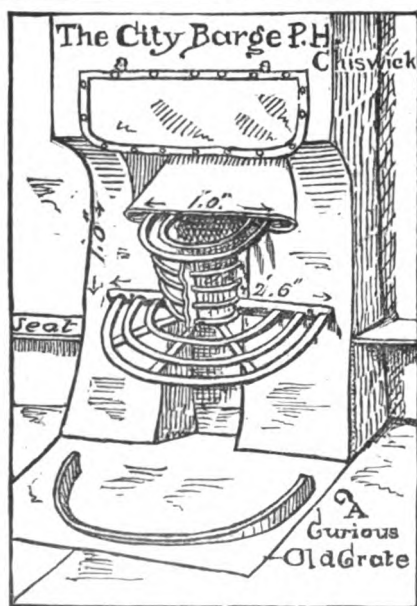
PLEASE inform me of the best mixture of paint to use on lead-lining of tanks. The lining is full of pin-holes and has only been in use a year. It is lined with 6-pound sheet-lead. The tank is used for supplying water-closets.

JAMES D. THOMPSON.

[We know of nothing better than what is sold as "black varnish." There are two different articles sold under this name. One has a basis of coal-tar, and when used may be diluted with naphtha; the other has a basis of natural asphalt and may be diluted with spirits of turpentine. We do not know that one is more durable than the other. The tank should be perfectly dry when the paint is applied. We do not know how long, at the longest, such a coating will last, but it can be renewed at a trifling expense whenever the tank is cleaned.]

A CURIOUS OLD GRATE.

THIS quaint old fire-place still exists at Chiswick, in "The City Barge" public-house, a tavern of some antiquity, like many other old houses still standing in the neighborhood of the church in this ancient village. Several of these were once important residences, while others, like Hogarth's house, have a historical character about them of more than ordinary interest. Their style for the most part is "Queen Anne," of the simpler sort, unpretentious enough perhaps, but nevertheless exceedingly roomy and hospitable, with large gardens, creepers, and trees. There are a few good specimens of iron-work, too, in the way of gates and railings, worth notice, and while there may be some who will pretend to regret the loss of the ugly old parish church, there are none probably who will fail to admire the fine new building now nearing completion, from the designs of Mr. John L. Pearson, R. A. The grate, which we illustrate from a sketch supplied for the purpose by Mr. Henry Jacques, gives the several figured dimensions. It is of wrought-iron, the top bars being three-quarters of an inch square. The front, or hob-bars, are an inch in diameter and round in section, and those to the fender-hob are flat, measuring an inch wide and three-eighths of an inch in depth. There is much that is admirable in this somewhat primitive contrivance, and while more modern arrangements may have superior advantages in many ways, it must be admitted that this old grate is both serviceable and picturesque.



The above sketch and abstract is taken from an English exchange. Unfortunately, we are unable to recollect the name of the journal to give the proper credit.

CONFERENCE OF LONDON PLUMBERS.

THE conference of plumbers held at the Health Exhibition on Friday divided its labors into the following sections: 1. The technical instruction of plumbers. 2. Apprenticeship, the duration and condition of indentures suited to the present state of the plumbing trade and to the modern system of technical instruction. 3. The establishment of metropolitan and provincial boards of examiners of plumbing-work. 4. The registration of journeymen plumbers. 5. The suitability of materials used in plumbing, and particularly of those materials recently

introduced as substitutes for lead. 6. The desirability of fixing upon a system by which uniformity in the quality of material used in plumbing may be insured. 7. The formation of district associations of plumbers to investigate and secure, as far as practicable, correction of evils and abuses arising in connection with the trade. 8. A general and executive committee to be formed for the purpose of receiving reports from district associations of plumbers and others, with a view to the preparation of a general report by the Plumbers' Company, to form the basis for an appeal to Parliament for necessary amendments and extension of the law relating to plumbers' work under the Building and Health Acts, and otherwise.—*The Builder*.

Reviews of Books.

ANNUAL REPORT OF THE COLUMBUS, O., WATER-WORKS, for year ending March 31, 1884.

This report is well arranged and clearly expressed. First, the trustees give a concise summary of the year's work, which comprises the pumping of 3,620,029 gallons daily under a pressure equivalent to a lift of 175.8 feet, the extension of the filter-gallery for 1,500 feet, the construction of a new pumping-engine, the laying of about a mile and a-half of new pipe, with fifteen fire-hydrants and 310 taps for domestic supply. The supply is by direct pumping, and the new engine, erected by the Holly Manufacturing Co., is of the type designed by Mr. Gaskill, and is capable of pumping 10,000,000 gallons in 24 hours. The test for duty made by Prof. Mendenhall showed a very high duty, partly attributable to the assumption of certain conditions which cannot exist in practice. The actual duty, however, was very creditable and far in excess of anything accomplished by the former type of Holly engine. The effect of this improvement was evident in the reduced cost of pumping 1,000,000 gallons, which was 87 cents less than in the previous year, though the new engines had only run one-quarter of the year. There is too much water used, the figures given showing a daily draught of 1,300 gallons daily per tap. This is at least four times as much as it ought to be. The Superintendent, Wesley Royce, gives some statements in his report which must be looked upon as purely imaginary, and, as such, misleading. Beginning with the assumption that the pump record shows the amount of water delivered into the mains, he gives the amount used for specific purposes, such as parks and drinking-fountains, flushing sewers, seventeen schools, city buildings, churches, and extinguishing fires, going so far as to name the exact quantity to a gallon (20,168,189) used for the latter purpose. Then he gives the quantity used by the seventeen largest consumers. This is presumably metered. Deducting the amounts mentioned from the total pumped, and assuming that there are 20,000 consumers of water besides, and allowing them 60 gallons a day each, he reaches the conclusion that there is a daily waste of 1,461,619 gallons, or nearly half the supply. Now, there is no doubt that there is an immoderate waste of water; there is such waste in every town; but it is absurd to attempt to figure out the amount of it so closely on such insufficient data. In pumping directly into the mains without the intervention of a tank or reservoir, there must necessarily be a large amount of slip and lost action in the pumps, and not nearly so much water pumped as the engine-counter would indicate, and therefore the declaration that this "waste" ought to yield a revenue of \$53,847.74 per annum, is fallacious. The fact is that the wasted water ought not to be looked upon as a possible source of revenue, but as an addition to the expense of operation. The cost of pumping having been \$13,787 for the year, if it is true that three-eighths of the water was pumped to waste, the annual expenditure might have been reduced \$5,000 if measures to repress waste had been taken. As there are 2,784 taps on the mains and only 557 of them have meters, the efforts to make consumers pay for all the water they use are not very vigorous.

If an employer found he was being robbed by his employees and only set a watch over one-fifth of them, he would not be considered very anxious to discover the guilty parties.

The Columbus water-supply is interesting, as being derived from a gallery about 4,500 feet long in porous, saturated gravel. The yield is approximately 1,000 gallons a day per linear foot of gallery.

The cost of construction of the water-works to the date of this report had been \$970,905.45, and the net cost after fourteen years' operation was \$772,273.54.

REPORT ON A PLAN FOR THE WATER-SUPPLY OF MOSCOW. By Civil Engineer N. Simin, of the Moscow Water-Supply Bureau.

In this volume the author explains in detail a plan proposed by him for furnishing the city of Moscow with pure water in sufficient quantities. His claim is that as the city lies on a plateau of considerable elevation above the sea-level on the eastern slope of the Waldai Mountains, it presents peculiar difficulties to the ordinary plans for furnishing city water, the available water resources being too far distant and on too low a level to give pressure enough to furnish a supply for the domestic and fire purposes of Moscow. Mr. Simin therefore proposes that a series of wells should be driven at suitable places in adequate numbers to assure a quantity of water sufficient for all the requirements of a city with three-quarters of a million inhabitants, the water supplied by these wells to be collected in reservoirs for general distribution. This plan of water-supply, the author tells us, has been introduced with success into other large cities of Russia, though of course into none of the size of Moscow.

REPORT ON THE HEALTH OF ASTON MANOR, during the year 1883. By Henry May, Medical Officer of Health. 32 pp. 8vo. Birmingham, 1884.

Aston Manor lies between Birmingham and the semi-rural district of Handsworth, and has an estimated population of about 59,000. Nine hundred and forty deaths were registered during the year, giving a mortality-rate of 16.0 per 1,000, as against 21.3 in Birmingham. Dr. May points out that this rate is below the true rate, owing to the fact that there is no asylum, hospital, or workhouse in the district, and hence some of the sick poor are sent to other districts and die there. During the year 167 cases of small-pox were reported, of which number 87 were removed to hospital. There died of this disease 8 persons in hospital and 3 at home.

Of the 87 cases removed to hospital, no less than 14 were totally unprotected by vaccination. Nearly every one of these were from grave cases, six of whom died. Besides these 14 cases, there were 24 others that had been insufficiently and imperfectly vaccinated, and among these were many severe cases, and two died. A temporary hospital for the care of these cases was established, the wards of which were composed of hospital tents, and were found to serve an excellent purpose. The means of disinfecting bedding and clothing possessed by the district are reported as very satisfactory. The Ransome disinfecting-apparatus is used, and in all houses where cases of dangerous infectious diseases have occurred the infected bedding and clothing have been carefully removed, and, after thorough disinfection, returned nearly always on the same day. Two hundred and seventy-seven loads of bedding and clothing, consisting of 6,705 articles, were thus disinfected, but no charge is made for this service.

The average of a dozen observations upon articles stowed in the apparatus shows that the inside of the bedding or clothing is subjected to a minimum heat above the temperature of boiling water for over five hours.

Average time of heating..... 5 hrs. 20 min.

" temperature of outlet thermometer. 269 deg.

" " inlet " 246 "

" " inside clothing..... 223 "

Dr. May urges compulsory notification by the medical attendants in cases of infectious disease, but states that, as a rule, the medical profession has taken up a hostile attitude toward it. The medical men in the district were instructed to notify cases voluntary, and a fee of two shillings sixpence in cases of small-pox was authorized. This, he says, has secured, with very few exceptions, not only prompt information of such cases from the medical attendants, but their co-operation in the arrangements that were desirable to be taken, and friendly conference and consultation with them in doubtful cases. He remarks, also, that this practice is equally desirable in cases of scarlet fever, when the district possesses the means of isolation, which at present it would seem is not the case, although steps have been taken to provide a permanent hospital for contagious disease. The water-supply in the corporation of Birmingham has nearly superseded the use of wells, which is a matter for congratulation. The examination of the water from twenty-one wells showed that four of them were found to be so polluted as to be injurious to health, and notices for closure were served. A percentage of 25.6 per cent. of 148 samples of milk were found to be adulterated, which is higher than the average throughout the country. The whole report is very satisfactory, both in matter and style, and shows that good sanitary work is being done in Aston Manor.

LA PROPRIÉTÉ DE L'INDIVIDU ET DE LA MAISON. Par Dr. E. Monin. 44 pp., 8vo. Paris, 1884.

This tract on cleanliness by the Secretary of the French Society of Hygiene is a prize essay published by the society for the instruction of the non-professional, but educated classes of France. Starting with the aphorism that cleanliness is one of the most powerful antagonists of death, the author proceeds to urge the benefits and comforts of preserving personal cleanliness of the skin by frequent baths and changes of clothing, and remarks that the regular use of the bath has not yet become a custom in France. The importance of providing cheap baths for the poorer classes is properly pointed out, and the advisability of providing public baths by municipalities is suggested. Clothing and bedding, the habitation, the school, the workshop, and the barrack are briefly considered in their relations to cleanliness, the whole forming a very readable pamphlet, well calculated to serve its purpose.

The author is rather severe on the existing arrangements and regulations for securing cleanliness in the army, declaring that for a long time nothing has been said, written or done to improve the cleanliness of the soldier, and that it is highly desirable that the army should not continue to be a school of dirtiness as it has for a long time been one of alcoholism. He declares that the army barrack is abominably mephitic from continued impregnation with all kinds of filth, and that the first thing to be done is to imitate the Prussians, and provide separate rooms for occupation by day and by night.

It will be seen that Dr. Monin is very much in earnest, and, according to English and American ideas of what constitutes cleanliness, there is much need of earnestness on this subject in France—and his essay seems well adapted to its purposes, which are to arouse interest and give instruction.

ANALYSE MICROGRAPHIQUE DES EAUX. Par A. Certes. Pph. 8vo., pp. 28. Paris, 1883.

This is a reprint of a paper read before the French Association for the Advancement of Science. The author thinks that the examination of potable water should include a chemical, a micrographical and a physiological analysis. Several years ago he proposed to add to a portion of the water under examination a small amount of osmic-acid, with a view of killing all the minute organisms, animal and vegetable, and at the same time of hardening their protoplasm and causing them to settle so as to be readily secured for microscopical examination. The present paper gives details as to methods, as to other substances which may be substituted for osmic-acid, as to various preservative liquids, and as to different colored solutions for straining the preparations.

PROCEEDINGS, ADDRESSES, AND DISCUSSIONS OF THE THIRD SEMI-ANNUAL MEETING OF THE KENTUCKY STATE SANITARY COUNCIL, held at Bardstown, Ky., March 26 and 27, 1884. 60 pp. 8vo. Louisville, 1884.

The Kentucky State Board of Health is following the example of the Michigan Board in endeavoring to instruct the people and to rouse an interest in its work, by means of conferences held in various towns, at which popular addresses and papers are presented. The object is in every way laudable, but we think that to effect it will require a different style of presenting the subject from that adopted in most of the papers in this volume. What is desired is to convince the people that they are undergoing discomfort, pain, sickness, death, and pecuniary loss from causes which are preventable, and to show them how these causes can be removed. This is not to be done by mere abstract advice—a single concrete example clearly presented and well worked out is worth a hundred exhortations. The great obstacle to sanitary improvement in Kentucky, as in many other places, is that the people do not know and have no means of knowing the condition of health of the country; they have no registration of deaths that is worthy the name, keep no account of the number of cases of infectious and specially preventable diseases occurring in the community, and consequently have no warnings or incentives to improvement in any given locality.

BURGH POLICE AND HEALTH (SCOTLAND) BILL (167).

THIS bill, prepared and brought in by the Lord Advocate and Solicitor-General for Scotland, and ordered by the House of Commons to be printed April 3, 1884, is substantially the same as the bill brought forward last year. The memorandum prefixed states that "the latest public statute regulating the police of towns in Scotland is the

General Police and Improvement Act, 1862, which is permissive in its provisions. It is partly a public-health act as well as a police act, in the narrower sense. The General Public-Health Act is the act of 1867. These statutes have been in several of the largest towns supplemented by private acts by which improvements suggested by experience have been introduced, but which have led to a considerable and apparently increasing diversity of legislation with regard to matters which, at least to a large extent, belong to the domain of public law.

"The object of this bill is to bring the general law up to date, and to regulate on uniform general principles the penal jurisdiction of magistrates and other matters of police, the sanitary law of towns, and the powers of assessment for these purposes by local authorities.

"Experience of the operation of the previous general acts, and particularly of the latest act of 1862, seems to show that it is practicable to construct a code sufficiently comprehensive to meet the wants of large towns, and at the same time sufficiently elastic to be adapted to those of small towns. Thus the large towns will maintain a police force, the small towns will be policed by the county. The minimum staff of officials prescribed by the act may be provided in small towns at comparatively small cost, while large towns may be expected to require an establishment on a different scale. It is accordingly proposed that the bill shall apply to all towns of over 2,000 inhabitants, and that smaller towns and populous places may adopt it if they please."

The clauses of the bill relating to compulsory notification of infectious diseases require that both the householder and the medical attendant shall notify the authorities of the existence of such disease, and for so doing the physician is to receive a fee of two and sixpence in each case. This will no doubt give rise, as heretofore, to opposition on the part of medical practitioners.

Some opposition is also being made by the authorities of Glasgow on the ground that it gives power to the small burghs immediately surrounding the city to combine, and to some extent to oppose or counteract the sanitary regulations of the city.

The bill forms a voluminous document of 234 pages folio, and is, upon the whole, a good one. As a compend of sanitary law, and as suggestive of the measures which should be adopted to secure municipal police, it will be found very useful by the health officials of the United States, and for this purpose we recommend it to their attention.

ROOFING OF THE ROYAL EXCHANGE.

THE following particulars of this work are abstracted from an article in the London Times. The architect, Mr. Barry, was assisted in the consideration of the engineering features by Mr. John Robinson, M. Inst. C. E.:

"The inclosure covered is about 116 feet in length, and 58 feet in width. The roof is in accordance with the style of the building, and was designed by Mr. Charles Barry, F. S. A., with the idea that any roof to be added over the open area should be not a mere glass cover, but of a character consistent with the architecture of the court, such that it might have been designed by the architect of the building, the late Mr. Tite, as a great saloon, had he been so instructed originally. The design of the roof is symmetrical, applicable only to the particular building. The ceiling is composed of glass coffers, glazed in prismatic form, with the tops hinged so that the inside can be cleaned from the outside. In the centre of the roof is a dome 40 feet in diameter, around which are louvres for ventilation. Access for cleaning, removing snow, etc., from every part of the outside of the roof has been provided with complete safety to the workmen by means of steps on each main rib, by a platform or gallery around the outside of the dome, and another around the lantern-light. For the principals a box section has been adopted, as being peculiarly suitable for resisting the strains to which the roof is subjected. They are arched in form, with a total rise of 17 feet. There are eight principals or ribs, six of which span the court-yard, 58 feet in width, and the two centre ones carry the dome or cupola. Trussed principals in such a situation have been considered inadmissible, and they are therefore made without tie-beams to prevent them thrusting out the walls. Neither are there buttresses behind the walls to resist the thrust of an arch. Under these peculiar conditions the principals, although arched in shape, are designed to act as girders, with a vertical or downward pressure upon the walls. The latter being only two feet thick would resist but little horizontal or outward thrust. The strains in

the girders do not exceed $5\frac{3}{4}$ tons per square inch in tension, and $4\frac{3}{4}$ tons in compression. For calculation, the maximum horizontal pressure of the wind has been assumed to be half a hundred-weight per square foot of vertical surface opposed to it in roof and dome, coming from any quarter. The greatest strains are in the two girders carrying the dome, and one of these has been tested with loads equal to all the weights and pressures that can possibly come upon it, in order to ascertain if there would be any danger of its thrusting out the walls. The feet rested on iron plates, and spread apart with the loads already mentioned half an inch, and this was due in a great measure to the two halves of the girder having been fastened together with service-bolts. The result of this experiment is considered satisfactory. All the wrought-iron arched-roof principals were lifted into position by means of an upright timber or derrick, 95 feet high and 16 inches square, properly guyed, from which the girders were suspended by their middle with a rope a little over two inches in diameter. Additional strength was given to the derrick by a system of trussing with twisted strand-wire and short wooden struts, to prevent flexure. The tackle consisted of upper and lower blocks, each containing three sheaves, which made six parts to the rope. The first girder erected weighed, with its attachments, nine tons. Besides the tackle mentioned, a double-purchase crab was used, and a separate snatch-block at the foot of the derrick."

CARBONIC-ACID IN THE AIR OF BERLIN SCHOOL-ROOMS.

RIETSCHEL has determined the amount of carbonic-acid in the air of various Berlin schools, with results which are given in the following table. The names of the institutions and the system of heating are given below:

HOUR.	VOLS. CARBONIC-ACID IN 1,000 VOLS. AIR.			
	I.	II.	III.	IV.
8.....	1.0	0.5	0.6	0.5
9.....	3.65	3.3	1.65	.....
After 5 minutes' recess.....	.....	2.0	1.35	.....
10.....	5.45	3.5	.....	1.05
After 10 minutes' recess.....	.....	1.5	.....	0.6
11.....	.....	3.6	1.9	.....
12.....	.....	.....	1.75	1.18
After 5 minutes' recess.....	.....	.....	.....	1.0
1.....	8.15	4.1	.....	1.18
Mean.....	.....	2.55	1.45	1.0

I.—Friedrich-Wilhelm Gymnasium. (Stoves.)

II.—Wilhelm Gymnasium. (Hot water.)

III.—Louisen Gymnasium. (Hot air.)

IV.—Joachim's Gymnasium. (Hot air.)

—Centralblatt für Allgemeine Gesundheitspflege.

HEALTH WORK IN BROOKLYN.

A SUMMARY of the health work done recently in Brooklyn was given by Commissioner Raymond, of the Health Department, to an Aldermanic Committee on the 4th inst. The Commissioner was before them to give estimates of cost of the work of the department. Lately, the investigation of adulterations of articles in common use has received much attention from the chemist, Dr. Bartley. Soda-water has been examined for copper, samples of wall-paper tested for arsenic, and samples of condensed-milk examined at the request of persons who thought they contained deleterious substances. Watch is kept on the milkmen as they enter the city in the early morning, and suspicious milk is tested at once. When the systematic investigation of the milk-supply was begun two years ago, 46 per cent. was found to be adulterated, principally with water. At present the adulteration is only five per cent. The department has also attempted to stamp out disease in the cow-stables, and to prevent the sale of diseased cattle from the stables to be slaughtered and sold for food. In enforcing the plumbing law more inspectors are needed, as the erection of new buildings is going on so rapidly as to exceed the power of the small force of inspectors to attend to them. Since the plumbing law began to be enforced it is estimated 10,000 houses, lodging 90,000 persons, have been built with the plumbing in accordance with that law. Two inspectors look after the plumbing in old houses. The committee appropriated \$69,050 for the work of the department, being a total increase of \$8,100 over the previous year, of which \$7,000 is for health purposes proper.

FRENCH journals allege that merchants in China have tried hard, since the Tonquin difficulties, to export poisoned tea into France.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING OCTOBER 4, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	9	13.3	4	44.4			2		1													6
Boston	Mass.	435,000	211	25.2	103	48.8	5	1	29	3	26	9		9		5	8		8	1				
Lowell	Mass.	71,500	35	25.5	14	40.0	2	2	3		13			3		1	1							
Worcester	Mass.	69,000	27	20.3	9	33.3			1	1	4	1		3			2		1			1		
Fall River	Mass.	67,000	24	18.6	17	70.8		1	1		8						2		1					
New Haven	Conn.	69,500	20	14.9	7	35.0			4	1		2							1					
Providence	R. I.	125,000	37	15.4	17	45.9	2		3		3	1	1	1		2	2							
Total		872,000	363	21.6	171	47.1	9	4	43	6	55	13	1	16		8	13	3	10	1		1		6
EASTERN CITIES.																								
Albany	New York	103,000	39	19.7	15	38.4		1	4	1	3	1		2			3	1						1
New York	New York	1,355,000	609	23.4	255	41.8	26	2	84	12	85	19	2	13	16		40		24		5	7		19
Brooklyn	New York	670,000	271	21.0	135	40.8	10		28	4	49	11		3	7	1	12		7	3		4		6
Hudson County	New Jersey	225,000	78	18.0	38	48.7	2		10	2	12	6		3		4	3		2					
Newark	New Jersey	154,000	52	17.5	29	55.7			4	4	1	3			5	1	1		1					1
Philadelphia	Pa.	940,000	347	19.2	137	39.4	7	4	42	9	27	12	3	20		3	12	2	8					1
Wilmington	Delaware	50,000	29	30.2	10	34.4			4	2	1	3		2	1		1							
Total		3,497,000	1,425	21.2	619	43.4	45	7	176	34	178	55	5	44	29	9	72	3	41	3	5	11		28
LAKE CITIES.																								
Buffalo	New York	105,000	34	16.8	13	38.2	3	1	6	2	6	1		2			2	1	2	1				1
Rochester	New York	105,000	34	16.8	13	38.2	3	1	6	2	6	1		2			2	1	2	1				1
Cleveland	Ohio	210,000	84	20.8	49	58.3	4		8		21	1		5	1	1	3		1		2			
Detroit	Michigan	140,000	83	30.8	47	56.6			3	1	16	6	1	4	2		3		1					
Chicago	Illinois	147,000	76	26.9	53	69.7	5		5		16			2			3	1	1	2				
Milwaukee	Wisconsin	147,000	76	26.9	53	69.7	5		5		16			2			3	1	1	2				
Total		602,000	277	23.9	162	58.4	12	1	22	3	59	8	1	13	3	1	13	2	4	3	2			
RIVER CITIES.																								
Pittsburg	Pa.	275,600	102	19.2	43	42.1	6		14	2	13				1	1	6	1	2			1		
Cincinnati	Ohio	275,600	102	19.2	43	42.1	6		14	2	13				1	1	6	1	2			1		
Louisville	Ky.	137,000	49	18.6	17	35.9			10		3			4	3		3							
Indianapolis	Ind.	137,000	49	18.6	17	35.9			10		3			4	3		3							
Minneapolis	Minn.	100,000	25	18.2	12	34.2	4	3	4		4	6		2			1							1
Evansville	Ind.	75,000	14	9.7	6	42.8	1		1					2	2									
Kansas City	Mo.	375,000	138	19.1	57	41.3	8		10	1	13	5		4	11	2	2	5	3					
St. Louis	Mo.	375,000	138	19.1	57	41.3	8		10	1	13	5		4	11	2	2	5	3					
Total		962,600	338	18.2	135	39.9	19	3	39	3	33	11		12	17	3	12	6	5			1		1
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	49	19.0	13	26.5			5		3			4	3		1					1		
"	Col.	69,300	41	30.8	21	51.2			6		10			1	3	1	1	1						
Richmond	Va.	41,000	10	12.7	2	20.0			1		2			1										
"	Col.	32,400	21	33.7	6	28.5			3					2	1		1							
Charleston	S. C.	25,000	9	18.7	2	22.2			1					1	2									
Atlanta	Geo.	27,800	34	63.7	19	55.8	1		1	1	2	2		1	3			1	1			1		
"	Wh.																							
Augusta	Geo.																							
"	Col.																							
Savannah	Geo.																							
"	Wh.																							
Nashville	Tenn.	35,100	16	23.7	7	43.7	2	1	1	2		3		1	2									
"	Col.	21,300	14	34.2	6	48.8			4					2	1									
New Orleans	La.	171,000	78	23.7	20	25.6	1	1	0		2	2			16									
"	Col.	63,000	37	30.5	6	16.2			6		4				4		1		1					
Total White		405,900	162	20.7	43	26.5	3	2	17	2	7	5		6	23	1	3	2	2			1		1
Total Colored		218,800	147	35.8	58	39.4	1		20	1	20	3		5	12	1	3	2	2			1		1
Total in 28 U. S. Cities		6,553,300	2,713	21.5	1,188	43.7	89	17	317	49	352	95	7	96	84	22	116	16	64	7	7	15		37
September 20.	Total in 28 English Cities		8,762,354	3,518	21.0		108				413	29		91		82				41		7		52
" 20.	8 Scottish Cities		1,254,607	503	20.8		25				51	20		15		14			55	7			23	
" 20.	16 Irish Cities		858,660	379	23.0		4		47		37	4		2		10			46				6	
" 20.	139 German Cities																							
" 20.	15 Swiss Cities																							
" 20.	15 Swiss Cities		455,537	141	16.1		6		26		14	3		3		1		14				1	2	

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

The weekly return of 28 United States cities, having an aggregate population of 6,553,300, for the week ending October 4, 1884, registers 2,713 deaths, which is equivalent to an annual death-rate of 21.5 per 1,000, which is 0.8 lower than that of the preceding week. Children under 5 years of age contributed 43.7 per cent. of the deaths. The rate in the North Atlantic cities was 21.6; in the Eastern cities 21.2; in the Lake cities 23.9; in the River cities 18.2; and in the Southern cities 21.6; in the whites 20.7, and for the colored 35.8 per 1,000.

Accidents caused 3.2, consumption 11.6, croup 1.8, diarrhoeal diseases 12.9, and diphtheria 3.5 per cent. of all deaths. The percentage from diarrhoeal diseases was highest in the Lake cities, 21.2, and lowest among the whites in the Southern cities, 4.3 per cent. Typhoid fever caused 3.5 per cent. of all deaths; in the Lake cities the proportion was 4.6, in the North Atlantic cities 4.4, and in the River cities 3.5. To malarial fevers were attributed 3.0 per cent. of the deaths; in the Southern cities among the whites they caused 14.1 per cent., and among the colored 8.1 per cent. The percentage of deaths from pneumonia increased considerably over the previous week, being 4.2 per cent. against 3.2. Measles caused 0.2, puerperal diseases 0.5, and whooping-cough 1.3 per cent. of the deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 59 new cases of typhoid fever, 62 of scarlet fever, and 31 of diphtheria.

DETROIT, MICH.—Dr. O. W. Wight reports 21 new cases of diphtheria and 3 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 15 cases of scarlet fever and 3 of diphtheria under treatment October 4.

BALTIMORE, MD.—The return of the Health Officer records 154 deaths during the week ending October 4, which is equivalent to an annual death-rate of 19.5 per 1,000; or 17.5 for the whites and 31.2 for the colored. Children under 5 years contributed 42.8 per cent. of the deaths. Diphtheria caused 12 deaths, croup 2, scarlet fever 2, whooping-cough 1, typhoid fever 2, malarial fevers 6, diarrhoeal diseases 20, consumption 16, acute lung diseases 6, and violence 5.

MASSACHUSETTS.—During the week ending September 27, in 104 towns of the State, with an aggregate population of 1,179,491, there were 522 deaths, which is at the rate of 23.0 per 1,000 annually, against 20.6 for the previous week. The principal zymotic diseases contributed 165 deaths, among which were diarrhoeal diseases 94, typhoid fever 22, diphtheria and croup 21, scarlet fever 9, whooping-cough 7, and malarial fevers 1. Consumption caused 57 deaths and lung diseases 34. Deaths under 5 years of age numbered 243. The highest rates recorded were 32.3 in Haverhill and 29.7 in Taunton.

PHILADELPHIA, PA.—Return for the week ending September 27, too late for tabulation. The deaths numbered 330, of which 125 were under 5 years of age. Accidents caused 17 deaths, croup 12, consumption 54,

diarrhoeal diseases 31, diphtheria 16, typhoid fever 10, scarlet fever 2, pneumonia 11, whooping-cough 4, and small-pox 1.

CINCINNATI, O.—The return the week ending September 27 was not received in time for tabulation. There were 95 deaths, including 48 under 5 years of age. Accidents caused 2 deaths, consumption 10, croup 5, diarrhoeal diseases 12, diphtheria 3, measles 1, and puerperal diseases 2.

ST. LOUIS, MO.—The report for the month of September records 673 deaths, which is 44 less than the previous month this year, and 43 less than the corresponding month last year. The annual death-rate was 20.1 per 1,000. The zymotic diseases caused 237 deaths, against 268 for the corresponding month last year. Scarlet fever caused 11 deaths, diphtheria 27, croup 8, whooping-cough 2, typhoid fever 28, malarial fevers 41, and diarrhoeal diseases 89, of which 67 were under 5 years of age. To consumption were attributed 56 deaths, to acute lung diseases 40, and to different forms of violence 44.

NEW HAVEN, CONN.—During the month of September there were reported 103 deaths, which was 19 more than in the corresponding month last year, and 15 more than the average in the corresponding months of the past 5 years. The annual death-rate was 16.5 per 1,000. The zymotic diseases all showed a slight increase over September, 1883. Diphtheria caused 4 deaths, whooping-cough 1, malarial fever 1, typhoid fever 5, diarrhoeal diseases 14, consumption 16, and violence 1.

ENGLAND.—The return of the Registrar-General for the week ending September 20 gives the death-rate in the 28 large towns of England and Wales as 21.0 per 1,000. The highest rate recorded was in Leicester, 29.9;

the lowest, 14.9, in Portsmouth. The highest annual death-rate from diarrhoeal diseases was 6.7 in Leicester, 6.6 in Hull, and 6.4 in Sunderland. The 29 deaths from diphtheria included 21 in London and 3 in Liverpool. Small-pox caused 10 deaths in London and 1 in Sheffield.

LONDON.—Births, 2,498; deaths, 1,315; the former was 126 and the latter 101 below the average numbers in the corresponding weeks of the last 10 years. The annual death-rate was 17.1 per 1,000, a lower rate than has been recorded in any week since October, 1883. Of the decedents 520 were under 5 years of age. The number of fatal cases of small-pox numbered 10, while the number of cases under treatment in the hospitals was 497, there having been 66 new cases admitted during the week. Deaths from diarrhoea, which had been 209, 178, and 126 in the three preceding weeks, further declined to 86, and exceeded the weekly average by only 3. Measles caused 18 deaths, scarlet fever 26, whooping-cough 22, diphtheria 21, typhoid fever 27, consumption 150, lung diseases 159, and violence 53.

SCOTLAND.—The annual death-rate in the 8 principal towns during the week ending September 20 was 20.8 per 1,000. This rate is 0.8 above that of the corresponding week last year, but 0.7 below that of the previous week this year. The lowest mortality was recorded in Perth, 11.8; the highest in Paisley, 24.1 per 1,000. The mortality from the zymotic diseases was at the rate of 5.4 per 1,000,

Glasgow.—Deaths, 235; annual death-rate 23.6 per 1,000. Measles caused 5 deaths, scarlet fever 11, diphtheria 11, whooping-cough 10, fever 12, diarrhoea 24, acute lung diseases 28, and violence 11.

IRELAND.—The average annual death-rate in the 16 principal town districts for the week ending September 20 was 23.0 per 1,000.

Dublin.—Deaths, 177; annual death-rate, 26.2 per 1,000. Scarlet fever caused 5 deaths, whooping-cough 4, diphtheria and typhoid fever 1 each, diarrhoea 20, consumption 20, acute lung diseases 18, and violence 4.

Belfast.—Deaths, 89; annual death-rate, 21.4 per 1,000. Scarlet fever caused 3 deaths, typhus fever 2, diphtheria 2, typhoid fever 1, diarrhoea 8, consumption 15, and acute lung diseases 10.

FRANCE—Havre.—September 7-13: Deaths, 70; annual death-rate, 34.4 per 1,000. Typhoid fever caused 2 deaths, croup 2, diarrhoeal diseases 19, consumption 11, and violence 2.

Marseilles.—During the month of August the deaths numbered 1,237, of which 353 were under 5 years of age. The annual death-rate was 41.2 per 1,000. Typhoid fever caused 46 deaths, measles 12, whooping-cough 6, scarlet fever 1, small-pox 4, diphtheria 11, diarrhoeal diseases, exclusive of cholera, 129, consumption 119, and violence 31. Asiatic cholera caused 391 deaths (adults 347, children 44), against 1,216 for July, and 11 during June. During the first 10 days of September there were 44 deaths, there being only 1 death on the 10th. Of the whole number of deaths, 1,618, from June 27 to September 1, 1,003 occurred in the city, 268 in the suburbs, and 347 in the hospitals. Of the decedents only 74 were under 5 years of age, 1,349 between 5 and 60 years, and 195 over 60 years of age. The French contributed 1,140 deaths to the epidemic, or 3.91 per 1,000; the Italians 427, or 7.37 per 1,000; all other strangers 51, or 3.64 per 1,000.

ITALY—Turin.—August 24-30: Deaths, 90; annual death-rate, 17.6 per 1,000. Typhoid fever caused 5 deaths, diphtheria 1, croup 1, diarrhoeal diseases 19, and violence 2.

During the week ending September 6 there were 103 deaths, equivalent to a rate of 20.2 per 1,000 annually. Small-pox caused 6 deaths, typhoid fever 4, diphtheria 1, diarrhoeal diseases 21, consumption 13, and violence 2.

DENMARK—Copenhagen.—During the week ending September 16 there were 155 deaths, of which 33 were under 5 years of age. The annual death-rate was 30.2 per 1,000. Measles caused 4 deaths, scarlet fever 1, diphtheria 2, croup 1, whooping-cough 5, typhoid fever 4, diarrhoeal diseases 20, consumption 15, acute lung diseases 8, and violence 2. During the week there were reported 106 new cases of measles, 19 of scarlet fever, 15 of diphtheria, and 28 of typhoid fever.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Natural Gas-Light Company.	Municipal Gas-Light Company.	Hardin Gas-Light Company.
October 11...	25.23	18.29	22.51	29.54	27.25	18.31

E. G. LOVE, Ph.D., Gas Examiner.

A NATURAL-GAS main burst in Temperanceville, Pa., October 7, and an explosion followed.

THE Attorney-General of the State of New York has authorized the dissolution of the Equity Gas Company of Brooklyn.

THE Western Union Telegraph Company has made a contract with Mr. David Brooks to run the main wires of the company in Philadelphia underground.

CHARTERS have been issued by the State Department, Harrisburg, Pa., to the Sterrett, Wilkinson, and Braddocks Natural-Gas Fuel Companies, of Allegheny County.

THE liquid found in the cylinders used in the Pintsch system of compressing gas contains, according to Mr. Greville Williams' examination, olefines, benzol, and toluol.

FLINT, MICH., is about to vote on a proposition to light the city with electricity, and in the meantime the gas company is making improvements which will cost in the neighborhood of \$30,000.

BOSTON, MASS.—At a meeting of the Board of Aldermen held on the 29th ult., the petition of the Consumers' Gas Company was defeated by a vote of 8 to 4. A motion for reconsideration was lost.

MR. J. BIEL, in an article on Russian Petroleum, published in *Dingl-polyt. Jour.*, states that flat burners consume from 34 to 38 per cent. more oil than round burners, the illuminating-power being the same in both cases.

A CASE is mentioned in the *Nordiskt Med. Arkiv.* of the poisoning of six families occupying one house, by illuminating-gas, which came from a break in the street-main and penetrated through the soil into the cellar. There was not a single gas-pipe in the house.

THE Providence Gas-Light Company manufactured during the past year 339,460,000 cubic feet of gas, or an increase of nearly 5 per cent. over 1883. The sum of \$51,396 was received for residuals. The public lamps are provided with 5-foot burners, which are lighted at the rate of \$1.50 per 1,000 feet.

THE *Ithaca Journal* says that the electric-current from an electric-light wire, which crossed a "dead" private telegraph wire, passed through the private wire to the metallic roof of a house in that town, down the rain-leader and into a water-pipe, giving a severe shock to the mistress of the house when she attempted to turn water on at a faucet connected with the water-pipe.

THE accounts of the Glasgow Corporation Gas Trust show that for the year ending May 31 last, the revenue amounted to £418,775 and the gross expenditure to £303,562. In 1874 it made 1,649,616,000 cubic feet of gas from 181,499 tons of coal, while in 1884 it made 2,324,700,000 feet from 243,849 tons of coal. The leakage in 1874 was 18.7 per cent., in 1884 it was 11.76 per cent. Last year £48,909 was received for residual products, while in 1874 it was less than half this amount. The annual rate of increase in the consumption of gas during the past ten years had been 5.7 per cent. Ten years ago the price of gas was 5s. 5d. (\$1.30) per thousand, to-day it is 3s. 6d. (84 cents).

THE Special Citizens' Committee on Lighting the Streets, of Rochester, N. Y., reported to the Common Council on the 7th inst. that after considering the proposals of the gas, naphtha, and electric-light companies, they were in favor of the last named. The Brush Company had offered to furnish 800 lamps at \$90 per light per annum. If a less number of lamps, down to 750, should be required, the price should be reduced at the rate of 30 cents a night for each lamp, and if a greater number of lamps than 800 should be required, the price for the excess over 800 should be 30 cents per lamp per night. The committee believes that 800 lamps will be entirely sufficient for the proper lighting of the city, and on this basis there will be a saving of \$18,539 over the present cost of gas, naphtha, and electric lamps.

WE take the following particulars about a race between two electric-launches on the River Thames, Sept. 20, from the *English Mechanic and World of Science*. The launches were the "Electricity" and the "Australia," the latter a new launch built for an Australian firm. The "Australia" is 25 feet long by 5 feet 7 inches beam, and can carry 16 passengers comfortably. The battery of 50 small storage-cells is carried along the keel, and the Reckenzaun motor, weighing 390 pounds, drives a two-bladed gun-metal screw of 18 inches diameter and 11 inches pitch. The available power is as much as 6-horse-power mechanical, but in the new launch it will be used at the rate of 5-horse-power electrical. The "Electricity" is also 25 feet long and 5 feet beam, and carries a Siemens D dynamo, weighing 658 pounds, driving a steel screw of the same size as that supplied to the "Australia." Her cells are arranged along the sides, and the greater weight (she is of iron) of motor, cells, and hull, together with her narrower beam, caused her to sit deeper in the water than the new launch, which has been specially designed and fitted for her work. The "Electricity" has more power than the new launch, but her cells were at first coupled up in such numbers as to give the same amount of energy as was used on board the "Australia"—viz., 3,730 Watts, or five electrical horse-power. Soon after the start it was evident that the "Australia" was going faster than the older boat, and more cells had to be coupled on in the "Electricity" to enable her to maintain her place, the result being that she was beaten by about two lengths. They had a fairly good tide on the up voyage, and made the distance, about six miles, in 38 minutes and 1 second, equal to about nine miles an hour.

Association News.

PROVIDENCE MASTER PLUMBERS. — The regular quarterly meeting was held October 2. The report of the Executive Committee in regard to protection matters was heard; no

action was taken. The Treasurer then made his report, which finds the society in good standing, financially. Reports of the different committees were then heard and disposed of. A resolution was brought up in regard to taxing members of firms, which caused considerable discussion. A motion was then made that firms should be taxed in all dues, whether composed of one or more persons, as one tax, excepting the national assessment, for which each firm of more than one member will be assessed \$2 per year. The resignation of the Recording Secretary, E. T. McAuliffe, was accepted. Communications were read from Miller & Coates, also from the Cincinnati Master Plumbers' Association, which were received and placed on file. A paper on "Contract-Work" was read by Mr. James C. Conroy, which called forth much enthusiasm. A vote of thanks was given him by the members present. Other papers on the same subject will be read at a special meeting on the 16th. It being late, no other business of importance was transacted. The boys are active and in earnest in their support and aid to the officers by their presence and counsel at every meeting. The meeting adjourned to October 16.

PHILADELPHIA MASTER PLUMBERS.—The association held its regular monthly meeting on Thursday evening, October 9, the President, Mr. John J. Weaver, in the chair. The minutes of the last meeting were read and approved, and the different committees reported, but no business of importance was transacted. The roll of membership of the association was increased by the addition of two new names, and one application was received for admission to membership and action was, according to rule, postponed until the next meeting. The Executive Committee made no report on the subject of the proposed agreement between the manufacturers and dealers and the master plumbers, because no official action has been taken on the subject by either of them. The manufacturers and dealers have now under consideration the propositions submitted to their judgment. These propositions were the work of a committee of the Master Plumbers' Association, and no official action has been taken on them by the association, and very probably there will be no action taken until the manufacturers and dealers are heard from. There was not a large attendance at the meeting, and there being no business of importance to transact the meeting adjourned. A pleasant and profitable divergence from the regular order of proceedings was then inaugurated. The members were invited by the President, Mr. Weaver, who is ever on the lookout to make the meetings useful and attractive to the association, to speak of anything that had occurred lately, either to themselves or had come under their notice, which would be of an interesting nature to persons present, or to bring up any questions on which they were desirous of gaining information, and a number of those present brought up subjects and incidents that made the after-meeting a decided success.

Notes.

CONSTRUCTION.

PRIZE FOR ESSAY ON DRAINAGE.

THE Chicago Citizens' Association offers a prize of \$500 for the best practical essay on the main drainage, sewerage, and water-supply systems of Chicago and its vicinity. The question should be considered, says the committee, in connection with the Chicago River and the slips, the Des Plaines River and the Ogden ditch, the canal and Fullerton Avenue conduit, and should have special reference to a mode of securing an abundant supply of pure water, and of providing for the disposition of the sewage. The subject should embrace the city of Chicago and such of its suburbs as may properly use the same means of obtaining water and the same systems or lines of drainage.

The competing essays must be delivered to the secretary of the association, J. C. Ambler, on or before April 1, 1885, and be signed by some designation corresponding with the mark upon a sealed envelope, which shall contain the name and address of the writer.

NEW YORK CITY.—Plans have been filed by the Trustees of the Roosevelt Hospital for an annex, which will be five stories high, and its dimensions will be 50'x170'. It will be built of brick, with stone trimmings, and will cost \$130,000.

PETERSBURG, VA.—A water famine prevails so severely here that it has caused the closing of cotton factories, and the throwing out of employment of 700 working people.

SAVANNAH, GEO.—The City Council will apply to the General Assembly at its next session for the passage of a bill authorizing the city to construct such sewers and drains as may be necessary, and to continue the system of sewerage already considered by the Council.

THE CONTRACTS for the State Armory at Bridgeport, Conn., recently awarded, foot up \$32,000.

PERMITS for the erection of 813 buildings, to be built at an estimated cost of \$4,169,101, were issued in Brooklyn for the quarter ending on the 30th of September.

CHARLESTON, S. C.—The second artesian well of the Charleston Water-Works Company is finished at last, the extreme depth being 1,950 feet. Eighteen miles of mains have been laid, and the company is in position to furnish water for public and private purposes.

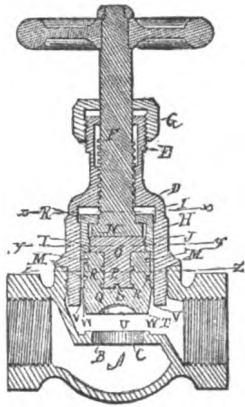
BOSTON, MASS.—A water-main in the Back Bay district, which was disturbed in building abutments for the Boston & Albany R. R., burst on the 4th inst. The water swept away four tracks, sleepers, and road-bed of railroad before it could be shut off.

NEW YORK AQUEDUCT BIDS.—Bids for constructing sections A and B of the new Croton Aqueduct will be received by the Aqueduct Commissioners October 29. The portion of the new aqueduct for which bids are hereby invited is in tunnel; Section A, extending from a point near the High Bridge, northward a distance of about 11,850 feet, and having three working shafts; Section B, extending from the end of Section A northward a distance of about 12,300 feet, and having two working shafts. Bidders can bid for either one or for both of the sections, but each section must be bid for, and will be awarded separately. Each bid must be accompanied by a certified check upon a National or State Bank of the city of New York, drawn to the order of the Comptroller of the city of New York, for an amount not less than five per cent. of the amount of the security required for the faithful performance of the contract. All deposits, except that of the successful bidder, will be returned by the Comptroller to the persons making the same within three days after the contract is awarded. The amount of security required in the contract for section A is \$125,000, and for section B, \$135,000, with not less than two satisfactory sureties, who must be householders, or resident freeholders of the State of New York. The address of the Aqueduct Commissioners is Room 78, Tribune Building, New York City.

PHILADELPHIA, PA.—Proposals have been opened for the grading and paving, in the best manner, the entire roadway surrounding the new city hall, and three firms presented bids—viz.: H. G. Clement, for noiseless wooden and concrete pavement and grading, \$3.95 per superficial yard, and the same price for Belgian blocks, with concrete foundation. D. & P. McNichol offered to lay a Belgian block pavement, according to city specifications, and grading for \$3.50, or flushed with pitch, at \$3.80 per yard. The Vulcanite Pavements and Barber Asphalt-Paving companies offered to do the work jointly at \$3.15, \$3.25, \$3.40, and \$3.50, according to the thickness, and the subject was referred to a committee, the latter pavement to be of the Trinidad asphalt pattern on a hydraulic concrete base. The contract was awarded to this company for an 8-inch concrete base, with a 2½-inch top dressing of Trinidad at \$3.50 per yard. This price includes all grading. The work is to be completed in 35 working days, and to be guaranteed for a term of five years. In order to avoid the necessity of tearing up the roadway around the public buildings, at a near period of time, all connections with sewers, water and gas mains around the building will be made before the new pavement is laid, and a subway will be placed all around the building to accommodate all conduits and wires that may hereafter be necessary for electrical purposes. This subway will be about 6'x9'.

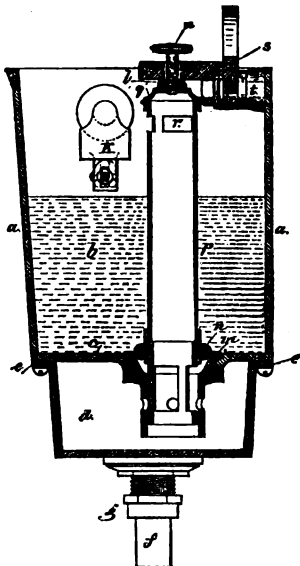
PHILADELPHIA, PA.—The Board of Port Wardens has awarded the contract for dredging certain docks along the river to the American Dredging Company at 24 cents per cubic yard. The contract for the work at the Twenty-Fifth Ward Gas-Works, for which bids were opened a week ago, has been awarded as follows: 2,800 yards of grading and 4,000 yards of paving was awarded to Smith & Porter at ten cents per yard for grading, and \$2.25 per yard for paving. The building of the wharf was awarded to Neveling & Co., and the construction of the plank road to J. P. Eyre, at \$2 per lineal foot.

4. The combination of the body of the valve, the seat therein, the removable top section of the body, having the piston-chamber, the spindle working through this section and formed with the enlarged end, the piston-



shell having the annular intumed top flanges and the interior annular flanges, the lock-nut having the annularly-flanged stem, and arranged in the piston to form the spindle-seat, and the soft-metal valve-disk molded in the piston and around the lock-out, substantially as and for the purpose set forth.

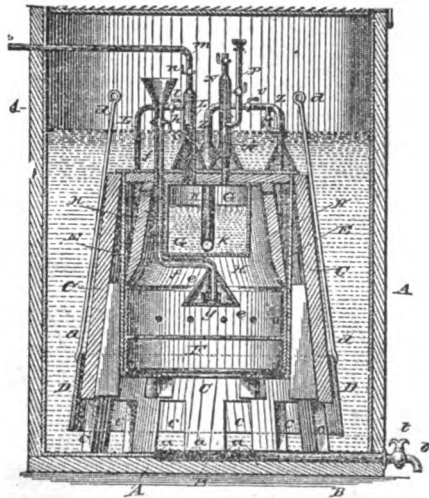
298,482. CISTERN FOR WATER-CLOSETS. JOHN DEMAREST, New York, N. Y., assignor to the J. L. Mott Iron-Works, same place. Filed April 4, 1884. (No model.) Issued May 13, 1884.



Claim.—1. The combination, with the cistern and valve-seat, of the rubber ring-valve *a*, the tube *b* within the valve, having a slotted lower end, forming a guide within the valve-seat, and overflow-openings near the upper end, the cap *c*, the lever *s*, and the screw passing through a hole in the lever into the said cap *c*, substantially as set forth.

2. The lever *s*, pivoted at the inside of the closet cistern and extending out laterally, in combination with the tube *b*, the cap at the upper end of such tube, the screw passing through the lever into the cap, the washer *l*, the valve *a* around the tube *b*, and the brass valve-seat secured in the bottom of the cistern, substantially as set forth.

298,482. APPARATUS FOR GENERATING AND CARBURETING HYDROGEN GAS. LEROY S. GROVES, Afton, Iowa, assignor to Joshua F. Bishop, same place, and J. H. Patt, Creston, Iowa. Filed June 23, 1883. (No model.) Issued May 13, 1884.



Claim.—1. The inner wooden jacket or skirt surrounding the gasoline-tank within the upper portion of the hydrogen-chamber, substantially as specified.

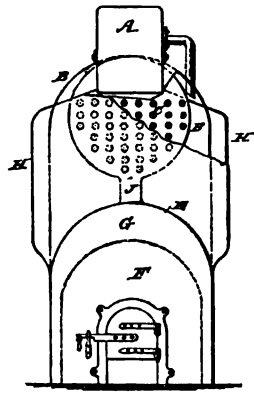
2. The open-bottom wooden casing *C*, having marginal ways or notches in its lower edge, and surrounding the hydrogen-chamber, substantially as specified.

3. The adjustable annular gate extending around the incasement *C*, and adapted to close the ways or notches thereof, substantially as specified.

4. The combination, with the incasement *C* and its adjustable annular gate, of a coiled or convoluted and perforated waste-pipe, substantially as specified.

5. The combination, with the basket *F*, for holding the clippings of iron, of the cleansing device, consisting of the tube *J*, provided near its upper end with the check-valve *A*, and the expanded discharge-chamber *E*, having a perforated base and cup *G*, substantially as specified.

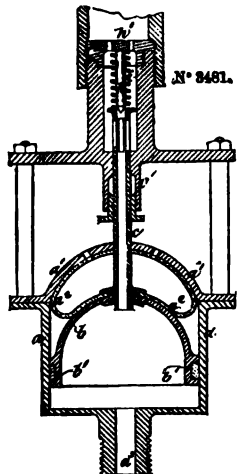
298,861. STEAM-BOILER. PATRICK FRANCIS DUNDON, San Francisco, Cal. Filed January 11, 1884. (No model.) Issued May 13, 1884.



Claim.—In a steam-boiler of the described class, the construction, combination, and arrangement, as hereinbefore described, of the lower shell, *E*, having water-space *G*, surrounding the furnace in whole or in part, the furnace *F*, communicating with the combustion-chamber *D*, the upper shell, *B*, containing the return-flues *C*, and having pipes or openings *J*, communicating with the top of the lower shell, the steam-dome or superheater *A*, and the flame-jacket *H*, the whole constructed, combined, and arranged substantially in the manner and for the purpose shown and set forth.

English Patents.

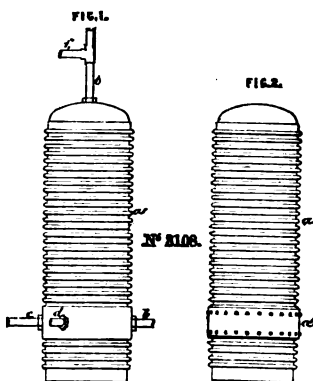
3,481. IMPROVEMENTS IN APPARATUS FOR GOVERNING AND REGULATING THE FLOW OF GASES AND LIQUIDS FROM GAS-HOLDERS OR OTHER RESERVOIRS IN WHICH THE SAME ARE CONFINED UNDER PRESSURE.



This invention has for its object improvements in apparatus for automatically governing and regulating the flow of gases and liquids from gas-holders, gasometers, reservoirs, or other holders, my improvements being particularly applicable for regulating the discharge of gas from vessels under pressure to gas-burners for illuminating and other purposes.

JAMES LEWIS, of 153 Brockley Road, Brockley, New Cross, in the county of Surrey, mechanical engineer.
Prov. spec. July 14, 1883. Letters patented January 14, 1884. (Price 6d.)

3,108. IMPROVEMENTS IN HOT-WATER APPARATUS FOR DOMESTIC AND SIMILAR PURPOSES, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:



The invention relates to apparatus used in dwelling-houses and other buildings for supplying hot water to bath-rooms and bedrooms and for culinary or other purposes.

JOHN ADDY HOPKINSON and JOSEPH HOPKINSON, both of the firm of J. Hopkinson & Co., of Huddersfield, in the county of York, engineers.
Com. spec. February 11, 1884.

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b* s, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown-stone dwelling; *apart house*, apartment-house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

142 Eldridge st, 5-story br factory; cost, \$19,000; o, Peter Reidenbach; a, Wm. Graul.
515-519 W 52d st, 3 5-story br tens; cost ea, \$16,500; o, Ellsworth L. Striker and John Quinn; a, C. F. Rider, Jr.; b, not selected.
31st st, s s, 300 e 1st av, 2-story br refrigerator bldg; cost, \$10,000; o, E. C. Swift; a, L. C. Wilker; b, B. P. Bailey.

54th st, n s, 375 e 10th av, 2 5-story br tens; cost ea, \$10,000; o, Jacob New; a, J. H. Valentine.
58th st, n s, 283 e 10th av, 5-story br and stone hospital; o, trustees of Roosevelt Hospital, Jas. Roosevelt, chairman; a, John G. Prague.

1st av, n w cor 70th st, 4-story and attic br school-house; cost, \$110,000; o, City of New York; a, J. N. Stagg.

84th st, s s, 150 w 2d av, 5-story br tens; cost, \$20,500; o, George Keller; a, John McIntyre; b, Hollister & Friedlein.

68th st, n s, 210 e 3d av, 5 3-story b s front dwells; cost ea, \$10,000; o, Wm. C. Schermerhorn; a, H. J. Hardenbergh; b, John Banta.

68th st, n s, 310 e 3d av, 5 3-story b s front dwells; cost ea, \$10,000; o, R. T. Auchmuty; a and b, same as last.

Av A, n e cor 75th st, 5-story br factory; cost, \$16,000; o, P. H. McManus; a, John Brandt.

Av A, e s, 25 n 75th st, 5-story br ten; cost, \$16,000; o and a, same as last.

60th st, n s, 170 w 10th av, 5-story b s front ten; cost, \$13,000; o, Thomas Cowman; a, M. Louis Ungrich; done by day's work.

70th st, n s, 425 w 9th av, 5 4-story b s front dwells; cost ea, \$24,000; o, Henry V. Hamilton; a, J. H. Valentine.

11th av, e s, from 61st to 62d st, 8 5-story br tens and stores; cost ea, \$20,000; o, Abraham Jonas; a, G. W. Spitzer.

BROOKLYN.

Union st, n s, 212 e 7th av, 2 3-story and bmt b s dwells; cost ea, \$10,000; o, etc., John Magilligan.
Bainbridge st, n s, 178 w Reid av, 4 2-story and bmt br dwells; cost ea, \$13,500; o, Kate Acor; a and b, C. Linken.

Ralph av, w s, 18 s Bainbridge st, 4 3-story fr (br filled) tens; cost, abt \$2,500; o, Elizabeth Phelan; a, F. F. Thomas.

4th av, n w cor 46th st, 3-story and bmt fr (br filled) tens; cost, \$20,000; o and a, W. A. Fries.

Franklin av, s w cor Wallabout st, 1 and 3 story br molding mill; cost, \$10,000; o, A. Dugan; a, A. S. Hait.

255 Greene av, n s, 275 e Grand av, 4-story br double flat; cost, \$12,000; o, etc., J. N. Smith.

Decatur st, s s, 162 11 w Throop av, 4 3-story and bmt br dwells; cost for all, \$12,000; o, Samuel Booth; a and car, W. C. Booth; m, C. Cameron.

ALTERATIONS, NEW YORK CITY.

410-412 E 13th st, 2 and part 1-story br extn, 24.4x88, cost, \$6,000; o, George B Marx; a, Ernest W. Greis.
106 E 40th st, repair damage by fire; cost, \$5,000; o, George G. Haven; b, George Mulligan.

ALBANY, N. Y.—Fuller, Wheeler & Prescott are the architects for the gate and lodge of Oakwood Cemetery, costing \$10,000. They are also supervising the steam-heating of St. Bernard's Church, and the steam-heating and plumbing of J. S. Cooke's residence, at Paterson, N. J.

ATLANTA, GEO.—Mr. Eichberg, of the firm of Fay & Eichberg, has submitted plans for the new jail, to be built at a cost of \$5,000.

BUFFALO, N. Y.—Delaware av, cor Huron st, br public school; cost, \$37,000; o, City; a, M. E. Beebe; b, S. Reimann.

Genesee st, cor Ash, br stores; cost, \$20,000; o, J. Sippel; a, L. Saenger; b, J. Jackle.

Elliott st, cor Broadway, br medical college; cost, \$21,000; o, Niagara Medical Society; a, H. H. Little; b, J. Churchyard.

Washington st, cor Broadway, Y. M. A. library; cost, \$225,000; o, Y. M. A. Society; a, — Eidlitz; b, J. Beier & Son.

Exchange st, br bldg; cost, \$8,000; o, Buffalo Seale Co.; a, Geo. Atkinson; b, J. Lannon.

CHICAGO, ILL.—779 Western av, br flats; cost, \$10,000; o, M. Civinci.

76-78 W Monroe st, br addn to factory; cost, \$10,000; o, A. Kniesly.

Elm and Larrabee sts, br st and dwell; cost, \$10,000; o, J. Niehuhr; a, John Otter; b, Lindgren.

Lake Shore drive, nr Division st, 5 br and 2 dwells; o, Paulsen; a, Henry Sierks.

61 Bellevue pl, br dwell; cost, \$13,000; o, George Manierre; a, Cobb & Frost; b, Louis Weick.

CLEVELAND, O.—Sibley, nr Greenwood st, br store bldg; cost, \$6,000; o, M. Barkeff; b, J. C. Grayell.

Bridge, Carroll, and York sts, repairs br brewery; cost, \$5,000; o and b, L. Schlather.

(Continued on page 468.)

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopoeial requirements.

We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

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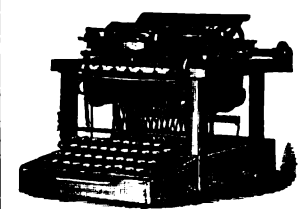
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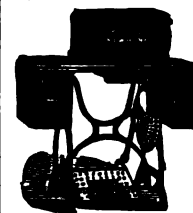
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Index to European Advertisements.

ALLDAY, J. L., Birmingham, Eng. Printing. P. 469.

CRAIG, J. & M., Kilmarnock (near Glasgow), Scotland. Grease-Traps. P. 469.

CAPPER, SON & CO., London, Eng. The "Twin-Basin" Water Closet. P. 469.

DOULTON & CO., London, Eng. Sanitary Specialties. P. 469.

HARTSHILL BRICK AND TILE CO., Stokes-on-Trent, Eng. Tiles. P. 469.

HOUGHTON & CO., London, Eng. Sanitary Specialties. P. 468.

HYGIENIC AND SANITARY ENGINEERING CO. (LIM.) London, Eng. Sanitary Specialties. P. 468.

JACKSON, J., Newcastle, Eng. Heating Apparatus. P. 468.

JOHNS, EDWARD, Rugeley, Eng. Plumbers' Earthenware. P. 469.

KEITH, JAS., London, Eng., and Edinburgh, Scotland. Heating and Ventilating. P. 469.

KING, P. S., & SON, London, Eng. Publishers and Booksellers. P. 468.

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THE LANGHAM HOTEL, London, Eng. P. 468.

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WOODWARD, JAS. Swadlincote, near Burton-on-Trent England. Sanitary Specialties. P. 469.

BUILDING INTELLIGENCE.

(Continued from page 467.)

CINCINNATI, O.—Flint st, s s, bet Freeman and Denman sts, 8 2-story br bldgs; cost, \$12,000; o, V. Whitney; b, Sherman & Burl.
N e cor Locust and Beach sts, church; cost, \$20,000; b, A. Heidbrink & Son.
George W. Rapp and Wm. Fries are architects for buildings valued at from \$6,000 to \$6,500.

DENVER, COL.—168 Curtis st, 2-story br store; cost, \$15,000; o, William Butterfield; a, Edbrook & Co.; b, day's work.

Curtiss and 22d sts, 3 br dwells; cost, \$10,900; o, Porter, Smith & Mars; a, William Quayle.
Holliday st, 3-story br and st dwell; cost, \$11,000; o, J. Rogers; a, Edbrook & Co.; b, C. J. Kelley.
Lawrence st, 2-story st bldg; cost, \$27,000; o, Chamber of Commerce; a, H. B. Seeley; b, W. F. Gommery.

Varian & Sterne are architects for buildings valued at \$5,600.

DETROIT, MICH.—Trumbull av, br dwell; cost, \$12,000; o, J. Wagner; a and b, Spier & Rohns.
Gratiot av, br store; cost, \$7,500; o, G. L. Weber; a, J. A. Morast; b, L. Schenble.
P. Coughlan, C. W. Green, and G. W. Lloyd are architects for buildings valued at from \$5,000 to \$7,000.

ENGLEWOOD, ILL.—Br st; cost, \$8,000; o, C. White; a, J. W. Ackerman.

FORT WORTH, TEX.—Hodgson, Wallingford & Stein have a contract to build an \$80,000 Methodist college; also a hotel worth \$50,000. Contractor or builder not known yet. The same firm has a Masonic Hall at Vincennes, Ind., worth \$28,000, and a private residence at Van Wert, O., for Mrs. Clara Davidson, worth about \$5,000.

HYDE PARK, ILL.—Br and terra cotta dwell; cost, \$9,000; o, Wm. Waterman; a, H. F. Starbuck; b, T. D. Reynolds.

KANSAS CITY, MO.—Bluff st nr Bridge st, stores and flats; cost, \$90,000; o and b, S. M. Bowman.

PHILADELPHIA, PA.—N w cor 18th and Berks st, 9 3-story dwells; o, J. Lewis Kates.

Montgomery av, e of Girard av, 2 dwells; b, Rollison & Taylor.
Collar e of Girard av, 2 dwell; b, Rollison & Taylor.

Hillery, bet Reed and Wharton sts, 6 2-story dwells; o, Thomas Marshall.
N e cor Neff and Adams sts, 4 2-story dwells, b, A. McClay.

Reese, s of Cambria st, 7 2-story dwells; o, W. H. Greenfield.

54th st, bet Wyalusing and Westminster avs, 1 dwell; b, Harry Pettit.

Spring, n e of Wood st, 10 2-story dwells; o, S. S. Keeley.

S w cor Germantown and Lehigh sts, 7 3-story dwells; o, Patrick Hogan.

Franklin, n of Cumberland sts, 8 2-story dwells; o, Amos D. Kennedy.

Broad, n of Norris st, 2 3-story dwells; o, C. C. Moore.

6th, s of McClennan st, 6 2-story dwells; o, William Morrow.

Hancock, n of Dauphin st, 4 2-story dwells; b, J. Williamson.

Ash, w of Salmon st, 2 3-story dwells; b, Sebastian Hein.

60th st, e of Kingsessing av, 2 dwells; b, Robert A. Parker.

Architect Thomas U. Walter has reported to the Trustees of Girard College on proposed alterations in the main building.

READING, PA.—Franklin st, 2-story br church; cost, \$15,000; o, Universalists of Reading; a, E. Mull.
5th st, 3-story br dwell; cost, \$7,500; o, H. A. Keim; a, Furness & Evans.

Perkiomen av, 4 3-story br dwells; cost, \$11,000; o and b, D. Roth.

Clymer st, 4 2-story and cottage roof dwells; cost, \$9,000; o, Friendship Building Association; a, E. Mull; b, H. Rummell.

Wm. A. Fink is architect for buildings valued at \$5,000.

ST. LOUIS, MO.—Arsenal and Lemp sts, 2-story ten; cost, \$7,600; o, H. Stamm; b, Geo. Roeder.

10th st and Park av, 2-story school-house; cost, \$11,000; o, St. Vincent's parish; b, J. S. Freye.

Theresa and Atlantic sts, 2-story distillery; cost, \$10,000; o, Rock Spring distillery; b, John Barnbrick.

16th and Carr sts, 3-story school-house; cost, \$16,975; o, the Board of Public Schools; b, Grumewald & Wind.

18th and Pine sts, 4-story carriage factory; cost, \$20,000; o, Cault & Hesse; a, A. Beinke; b, F. T. Hoffman.

Garrison st, nr Cass, 4 adj 2-story dwells; cost, \$13,000; o, J. Corcoran; b, Thos. Roesch.

21st and O'Fallon sts, 2-story ten; cost, \$7,200; o, S. Zebrowicz; b, Thos. Roesch.

Franklin st, bet 2d and 3d, 3-story warehouse; cost, \$18,000; o, E. C. Backer; b, E. Weber & Co.

O'Fallon st, bet 16th and 17th, 3 adj 2-story tens; cost, \$12,000; o, J. Biddle; b, E. Lynd & Son.

Grand and Montgomery sts, 2-story dwell; cost, \$8,500; o, E. Schulte; a, B. J. Goesse; b, Cephren Pranel.

St. Louis and Leffingwell sts, 5 adj 2-story tens; cost, \$11,500; o, J. Figshoff; a, B. J. Goesse; b, H. C. Brinknew.

5th and Morgan sts, 5-story bus houses; cost, \$20,000; o, Conn. Mutual Ins. Co.; a, C. E. Illsley; b, F. C. Bousak.

Montgomery and Leffingwell sts, 3-story school-house; cost, \$13,900; o, City; a, — Wilhemi; b, M. Beet.

Grand and Dellon sts, 3-story dwell; cost, \$10,000; o, H. S. White.

Barton and Kosciusko sts, 2-story warehouse; cost, \$9,000; o, Schaefer & Co.; b, Mich. Risse.

Bates and Collins sts, 2-story shop; cost, \$20,000; o, W. H. Tarman; b, E. Pipe.

Delmar and Cabenne sts, 2-story dwell; cost, \$9,200; o and b, S. H. Hoffman.

Elliott and Mullamphy sts, 2-story ten; cost, \$7,300; o, John Geist; a, B. J. Goesse; b, Rothe & Patterson.

WASHINGTON, D. C.—11th and K sts, n w, 2 br bldgs; cost, \$17,000; o, Western Flint; a and b, F. F. Schneider.

S w cor 21st and Mass. av, br bldg; cost, \$15,000; o, B. H. Warner; a and b, W. M. Poindexter.

B and C sts, bet 2d and 3d, 16 br bldgs; cost, \$8,500; o, Samuel Norment.

Chas. W. King is architect for a building valued at \$5,000.

Proposals.

PROPOSALS FOR HARBOR IMPROVEMENT.

U. S. ENGINEER OFFICE, }
BUFFALO, N. Y., October 15, 1884. }

Separate sealed proposals, in triplicate, will be received at this office until 11 o'clock A. M. (75th meridian time) on the 15th day of November, 1884, for dredging the west channel and repairing the East Breakwater at Dunkirk Harbor, N. Y.

Specifications, blank forms, and instructions to bidders may be had on application to this office.

EDWARD MAGUIRE,
Capt. of Engineers, U. S. A.

PROPOSALS FOR GLOBE-LANTERNS AND EXTRA GLOBES.

DEPOT QUARTERMASTER'S OFFICE, }
NEW YORK CITY, September 16, 1884. }

Sealed proposals, in triplicate, subject to usual conditions, will be received at this office until 12 o'clock noon, October 16, 1884, at which time and place they will be opened in presence of bidders for furnishing and delivering at this Depot, free of charge for cartage and packages, 400 globe-lanterns and 800 extra globes for the same. The lanterns must be arranged to burn both oil and candle and be of a pattern and size to use the same style and size of globes, wicks, and candles as the standard sample, which can be seen at this Depot. Samples must accompany proposals. The Government reserves the right to reject any or all bids, or to accept as may be most advantageous to the Department. Preference will be given to articles of domestic production and manufacture, conditions of price and quality being equal, and such preference given to articles of American production and manufacture produced on the Pacific coast to the extent of the consumption required by the public service there.

Blanks and information as to bidding, etc., will be furnished by this office on application.

Envelopes containing proposals should be marked "Proposals for Lanterns," &c., and addressed to the undersigned.

HENRY C. HODGES,
Lieut.-Col. Deputy Quartermaster-General.

PROPOSALS FOR ROCK EXCAVATION.

U. S. ENGINEER OFFICE, }
2136 PENNSYLVANIA AVENUE N. W., }
WASHINGTON, D. C., September 30, 1884. }

Sealed proposals, in triplicate, for the removal of rocks in the Georgetown Harbor, D. C., will be received at this office until 12 M., on Wednesday, October 22, 1884, and opened immediately thereafter.

Blank forms of proposals, specifications, and any desired information can be had on application at this office.

PETER C. HAINS,
Major of Engineers.

IMPROVING APPOMATTOX RIVER, VA.

U. S. ENGINEER OFFICE, }
NORFOLK, VA., September 23, 1884. }

Sealed proposals, in triplicate, will be received at this office until noon of October 23, 1884, and opened immediately thereafter, in the presence of bidders, for dredging one hundred and thirty-five thousand (135,000) cubic yards, more or less, and for furnishing small quantities of piles, lumber, gravel, brush, binding-poles, bolts, and spikes for the improvement of Appomattox River, Virginia.

Specifications, instructions to bidders, and blanks for proposals can be had on application to this office.

F. A. HINMAN,
Captain of Engineers, U. S. A.

IMPROVING HARBOR AT NORFOLK, VA.

U. S. ENGINEER OFFICE, }
NORFOLK, VA., September 24, 1884. }

Sealed proposals, in triplicate, will be received at this office until noon of October 24, 1884, and opened immediately thereafter, in the presence of bidders, for dredging in Norfolk Harbor, Virginia. The amount available for this work is \$23,000.

Specifications, instructions to bidders, and blanks for proposals can be had on application to this office.

F. A. HINMAN,
Captain of Engineers, U. S. A.

PROPOSALS FOR STONE AND BRICK WORK AT TERRE HAUTE, IND.

OFFICE OF SUPERVISING ARCHITECT, }
TREASURY DEPARTMENT, }
WASHINGTON, D. C., October 6, 1884. }

Sealed proposals will be received at this office until 2 P. M. on the 31st day of October, 1884, for supplying and setting all the stone-work, and furnishing and laying all the brick-work required for the basement and superstructure of the Post-Office, etc., building at Terre Haute, Ind., in accordance with drawings and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
Supervising Architect.

PROPOSALS FOR JOINERS' WORK AND WOOD FLOORING, AT MEMPHIS, TENN.

OFFICE OF SUPERVISING ARCHITECT, }
TREASURY DEPARTMENT, }
WASHINGTON, D. C., October 4, 1884. }

Sealed proposals will be received at this office until 2 P. M. on the 20th day of October, 1884, for furnishing and fixing in place, complete, all the joiners' work and wood flooring required for the Custom-House and Post-Office building, at Memphis, Tenn., in accordance with drawings and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
Supervising Architect.

Furnishing rip-rap granite for breakwater at Block Island, R. I.

Until October 28. Address GEORGE H. ELLIOTT, Lieut.-Col. Engrs., Engineer Office, U. S. A., Newport, R. I.

Materials and workmanship for new court-house at Galesburg, Ill., after plans by E. E. Myers, architect. Until October 24. Address W. SELDEN GALE, Chairman of Building Committee, County Clerk's Office, Galesburg.

Supplies for 2d and 3d Districts, Mississippi River—wire, iron, nails, spikes, hardware, castings, oils, paints, lumber, rope. Until October 25. Address CLINTON B. SEARS, Capt. Engrs., U. S. A., Engineer office, Memphis, Tenn.

Miscellaneous supplies for the San Antonio, Tex., Arsenal. Until October 29. Address ISAAC ARNOLD, Jr., Maj. of Ordnance, Comdg., San Antonio, Tex.

Removal of wreck of ship "Parkfield," Little Egg Harbor, N. J. Until October 22. Address W. H. HEUER, Maj. Engrs., U. S. Engineer Office, Philadelphia, Pa.

Materials and labor for court-house at Muncie, Ind. Until November 6. Address WILLIAM DRAGOO, Auditor, Muncie, Ind.

Furnishing steam-boiler for Cape Fear River improvement. Until October 24. Address WILLIAM P. CRAIGHILL, Lieut.-Col. Engrs. U. S. A., Engineer Office, Baltimore, Md.

Eight-inch tubes for converted rifles. Until November 7. Address S. V. BENNET, Brig. Gen. Chief of Ordnance, U. S. Ordnance Office, Washington, D. C.

Dredging in Coptank River, Md. Until October 23. Address W. F. SMITH, Engineer Office, Wilmington, Del.

Proposals for constructing Sections A and B of the New Croton Aqueduct in the Twenty-fourth Ward of the city of New York, will be received until Wednesday, October 23, 1884.

The portion of the New Aqueduct for which bids are hereby invited is in tunnel, and is divided into two sections—viz.:

SECTION A.—Extending from a point near the High Bridge, northward a distance of about 11,850 feet, and having three working shafts.

SECTION B.—Extending from the end of Section A northward a distance of about 12,300 feet, and having two working shafts.

Bidders can bid for either one, or for both, of the above sections, but each section must be bid for, and will be awarded separately. Any bidder for both sections who will not accept an award for one section only must so state in his bid.

Each bid must be inclosed in a sealed envelope, indorsed with the name of the person or persons making the same, and the section for which it is made.

The amount of security required in the contract for Section A is \$125,000, and for Section B \$135,000, with not less than two satisfactory sureties, who must be householders or resident freeholders of the State of New York.

Full information, blank forms, etc., may be obtained by addressing, J. W. McCULLOCH, Sec'y Board Aqueduct Commissioners, New York City.

Proposals will be received until October 25, 1884, for iron superstructure and supports of the Kingsbury, Pa., Viaduct, between Davies and Humboldt Streets. For further information, address C. G. FORCE, City Civil Engineer, Cleveland, O.

Bids for constructing wing-dams in the Savannah River, below Augusta, and in the Altamaha River, Georgia, at the U. S. Engineer Office, Army Building, New York, will be received until October 17, 1884.

For further information, address O. A. GILMORE, Bvt. Maj.-Gen. U. S. A., Col. of Engineers.

Proposals received for rock excavation and dredging in Taunton River, Mass., until October 24, 1884, at the Engineer's Office, U. S. A., at Newport, R. I.

For further information, address GEORGE H. ELLIOTT, Lieut.-Col. of Engineers U. S. A.

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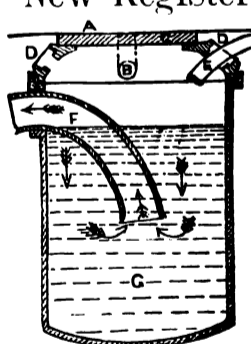
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THE SANITARY ENGINEER.

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PUBLICITY *versus* SENSATIONALISM IN SANITARY MATTERS.

It is sometimes a little difficult for persons who are not familiar with practical sanitary work to decide as to what should and what should not be said or printed with regard to the sanitary condition of their own locality.

Their opinions on this subject depend very much upon whether the criticisms are made by themselves or by some of their neighbors. It is by no means safe to assume that because a local health officer or the editor of a newspaper vigorously denounces some local nuisance, polluted water-supply, etc., and predicts the most direful and deadly results unless improvement is at once made, he will therefore smile approvingly upon similar comments made by another health officer or editor resident in another city. On the contrary, he will often conclude that they are trying to injure the commercial prosperity of his own peculiar charge, and will characterize their utterances as sensational and as calculated to do more harm than good. At the same time there are few editors who will refuse a good news item relative to the unhealthiness of some other city. It would be easy to give many illustrations of this phase of human nature, but we will select but one and that a rather mild specimen.

The majority of our readers probably know that for several years the pollution of the water-supply of Philadelphia has been the subject of comment by the press of that and other cities. This comment has had the effect of creating public opinion in Philadelphia to such an extent that an official investigation is in progress, and some valuable reports have been made by the Water Department, showing the reality of the evils complained of, and the importance of speedy action in the matter.

But as soon as this has been determined to be a fact, and not a mere vague sensational rumor, the editor of the Philadelphia *Ledger* becomes alarmed and declares that there is too much loose talk on the subject; that it is nothing new to have foul rivers; that when they are foul they purify themselves, etc., etc.; that "there should be far less official fuss made to scare people either at home or abroad;" that "obtrusive outgivings in regard to drainage into the Schuylkill have done mischief both in the city and out of it;" and that whatever is necessary "may be done with as good and quick result in quiet ways as when injurious public proclamations are made on the subject."

When the *Ledger* is moved to speak thus we consider it as a good sign that public opinion is really becoming roused as to the existence of the evil and the necessity for its abatement, and that there is a fair prospect that something will be done.

As Col. Ludlow, the Chief Engineer of the Water Department, remarks, in commenting on this editorial, "the policy of silence, of 'quiet,' of ignoring or withholding from the people facts in which they have a vital interest has been pursued for many years. * * * In modern communities there are but two forces upon which to rely for the correction of abuses—viz., public opinion and the law; and the law itself cannot be enforced in defiance of the undefined, but deeper and more potent power."

In the particular case of Philadelphia experience has certainly shown that the "quiet" plan

has done no good, and we do not think that the temporary evils which may be produced by calling attention to the dangerous condition of Philadelphia as a residence or place of business, by reason of its polluted water-supply and abominable system of sewerage, should for a moment be allowed to prevent publicity, and the attempt to form an intelligent public opinion which will compel the politicians to remedy the defects and thus prevent far greater evils which threaten, in the near future, to injure the commercial prosperity of the city and involve it in enormous expense if present conditions be allowed to continue.

PUBLIC BATHS AND WASH-HOUSES.

IN THE SANITARY ENGINEER for March 27, 1884, attention is called to the need for public baths for winter as well as summer service in our American cities, and a series of descriptions of public baths and wash-houses in England was promised to our readers. In the same number was published the first paper of the series, giving a historical sketch of what has been done in this direction in Great Britain, and a description of a model building erected for this purpose in Goulston Square, Whitechapel.

Owing to pressure of matter, and for other reasons, it was deemed best to defer the continuation of the subject for a few months, but the promise has not been forgotten, and in the present number we give the second paper of the series, which will be followed by the remainder without delay.

The utility of public laundries, wash-houses, and baths in large cities as a means of directly promoting the health and comfort of the poorer classes, and of indirectly stimulating them to secure and preserve greater cleanliness in their own homes, is so generally admitted that it would seem unnecessary to adduce formal arguments in its favor. Unfortunately in this, as in many other sanitary matters, it is a long step from mere theoretical assent and approval to the practical carrying out of the measures which secure the end desired; and while many large European cities have provided more or less completely for the wants of the poor in this respect, little or nothing has yet been done in this country beyond the providing of free floating swimming-baths for summer use in a few places.

It appears to us that the time has come when the matter should receive serious consideration on the part of our municipal authorities, and especially so in the city of New York.

The first question to be decided is as to whether such institutions should be free or not. Those which have been established abroad are not free, and we do not believe it is good policy to attempt to make them so. The payment required should be made low, sufficiently so to induce the class for whose benefit they are specially intended to make large use of them, and the price should not be fixed with reference to making them self-supporting institutions, but there should be a price to induce the poor to value them, and to prevent them from becoming instrumental in promoting pauperization by leading the poor to believe that what they cannot conveniently do for themselves is to be done for them from the public purse.

The scheme for free baths to be supported by a special tax on the owner of each house for

each tenant occupying his house, which is proposed by Dr. Tausky in a letter printed in the *Medical Record* of October 11, seems to us quite impracticable, and unlikely to lead to any good result, though his letter is timely and suggestive.

The idea of taxing a special class of the community, and that the poorest and least able to bear the burden, to create an institution which is to be free to all classes, is utterly foreign to the principles of legislation and jurisprudence which prevail in this country.

The thing of prime importance in these wash-houses and baths, which are intended for the use of the poorer classes, is that they shall be simple and economical in plan and construction, and shall be located in the immediate vicinity of the people for whose benefit they are designed. What are needed are not large and elaborate buildings, with ornamental façades, placed in conspicuous positions to serve as monuments of the public spirit and taste of the municipality, but plain structures, located in the poorer quarters, so as to afford the greatest possible facility of access. In planning them the needs of the laundry or wash-house portion should be considered as of prime importance, and in this part of the building precautions must be taken to prevent its becoming the means of dissemination of infection.

We shall have occasion to refer again to this subject after the publication of our series of descriptions of what has been done abroad. Meantime, we would urge the matter upon the attention of our municipal authorities, public-spirited citizens, and practical sanitarians and philanthropists as being in every way worthy of careful consideration and of united effort.

HOUSE-PLANTS AS SANITARY INDICATORS.

A BOSTON lady writes to us: "We began housekeeping ten years ago, with plants in two of the rooms for window ornaments, instead of lace and damask curtains. The house was a modern one, lighted by gas, and heated by a furnace, with no open fire-places in any of the rooms. Fortunately there was a skylight in a slope of the roof over the central hall, which we kept always raised some ten inches—in warm weather twice as much—and, since we kept the doors of the rooms open, the hall became a ventilating-shaft. The result of this automatic ventilation was so good that visitors exclaimed: 'Why, you have furnace and gas, yet your plants look as thrifty and fresh as if they had grown in a green-house. How do you do it?'"

"A somewhat careful study of the conditions of successful window-gardening led us to the conclusion that a house in which plants would not thrive was a house in which people ought not to live. We then allowed our plants to overflow into all the other rooms, and for years pointed with pride to the sanitary indicators, which also served the purpose of keeping the air moist enough, since on a sunny day these growing leaves will pump at least six quarts of water into the atmosphere of the house.

"Some three years since we had another chimney put up, so that three open fires were possible, but we did not see any great increase in the health of the plants, thus showing that the ventilation had been pretty good before. But the past winter the plants seemed to droop unaccountably; one or two nearly died, others lost their leaves, and the whole lot looked like the poor sickly things one so often sees in houses. So far as we could see, the conditions were the same as in previous years. Suspicion was lulled by the fact that even gardeners complained of so much cloudy weather as affecting the plants. A visit of inspection by the Sanitary Science Club in the late spring called our attention to some defects in the furnace air-box and draught-slides, also an occasional smell of gas, which had not been noticed in previous years, added an incentive to a thorough overhauling of the furnace as soon as the fire was dispensed with. The explanation of the behavior of the plants was found in a large hole in the iron lining of the fire-pot, so that a free communication of the air over the fire with that in the hot-air chamber was inevitable. This hole was caused by the rusting through of the iron, a result of carelessness in filling the water-pan, and finally of a leak in it, which escaped notice for some time. The iron partition must have been a long time in a bad condition, and only the good ventilation effected by the always-open skylight saved the family from serious consequences. They

should have taken immediate warning from the plants, and should have searched until the cause of the trouble was found.

"This case illustrates the necessity of watchfulness on the part of the housekeeper, since the furnace had been cleaned and examined each year by men from the shop, who were supposed to know best what was needed, and yet the danger had not been discovered. With the numerous modern conveniences 'eternal vigilance' is most certainly the price of health, and this vigilance must be exercised by the housekeeper, the one who is at hand, and who can follow out cause and effect as no one else can do. Hence the necessity of a knowledge of the construction and working of such important portions of household machinery as a furnace. When one considers in how many houses the management of this important instrument of comfort is left to ignorant and careless servants, one no longer wonders at the complaints so often heard."

OUR BRITISH CORRESPONDENCE.

Attendance at the Health Exhibition—Plumbers' Conference—Fever Hospitals—Liverpool Infectious Diseases Hospital—Commission on Calcutta Sanitary Matters—Sanitary Congress at Dublin.

LONDON, October 4, 1884.

IT has been officially announced that the International Health Exhibition will close on the 30th of this month. The exhibition will then have been opened one hundred and fifty-one days, and up to last Saturday 3,096,576 persons had visited it, so that by the time it closes it will have been visited by over four million people, and the profit made must be considerable. Although late in the day the Japanese have made their section—opened recently—well worthy a visit, and to the many other attractions they have added a Japanese restaurant, following the example of the Chinese, who have made their restaurant such a success.

A representative meeting of plumbers was held at the Guildhall here last week, Mr. Shaw, the master of the Plumbers' Company, in the chair. The object of the meeting was to make arrangements for a conference to be held at the Health Exhibition toward the end of this month, for the purpose of giving practical expression to the ordinance of the Plumbers' Company, which provides that "No one of the trade of plumbers shall meddle with works touching such trade, except by the assent of the best and most skilled men in the trade, testifying that he knows how well and lawfully to do his work; that, so the said trade may not be scandalized or the community damaged and deceived by folks who do not know their trade." As the chairman rightly pointed out there is no trade or craft which so directly affects the public health as that of plumbers, and it was the general feeling of the meeting that a set of rules by which the trade could be more satisfactorily carried on should be established. A resolution was passed at the meeting that the Plumbers' Company should communicate with the National Health Society, the Sanitary Institute of Great Britain, and other kindred societies, with a view to arrange for their co-operation in the proposed conference.

At the last meeting of the Metropolitan Asylums Board it was resolved that the several infectious hospitals under the control of the board should be designated "fever hospitals," upon the understanding that at each of such hospitals two isolation-wards be set apart for the reception and treatment of small-pox or other patients, and the remainder of the hospitals appropriated to the treatment of fever patients. Sir E. Currie, in moving the adoption of the above, pointed out the vast increase which scarlet fever was making throughout the metropolitan area. He stated that statistics show that 25,000 scarlet fever cases occurred in London every year and that the death-rate from that disease alone reached over 2,500.

The Health Committee of the Liverpool Corporation recommends the appropriation of twenty-five acres of Wavertree Park as a site for a hospital for infectious diseases. It also proposes the erection of a series of buildings, with a wide belt of land and trees to secure isolation.

The commission appointed to inquire into the performance by the Calcutta Corporation of its sanitary duties, has commenced work, and is now holding daily meetings and inspecting the worst parts of Calcutta.

The Sanitary Congress at Dublin was opened on the 30th of last month, under the presidency of Sir Robert Rawlinson, who, in his presidential address, dealt at some length on the evils and dangers attending quarantine in epidemics of cholera.

SAFETY-VALVE.

PUBLIC BATHS AND WASH-HOUSES—WHITFIELD STREET, ST. PANCRAS, LONDON.

No. II.

(Continued from page 401, issue of March 27, 1884.)

THE Parish of St. Pancras possesses two separate establishments of baths and wash-houses, one of which forms the subject of this paper. Of the two establishments that at King Street is the older, having been erected and opened for use in the year 1868, while the Whitfield Street baths were not opened until ten years later.

The Whitfield Street baths occupy a site of a rectangular form, 105'.0"x109'.0", and bounded on all four sides by streets.

The entrances to the wash-house and to the men's second-class baths are on the north; those to the men's first-class baths and to both classes of women's baths are on the east.

There are two swimming-baths; the first-class is 90'.0"x28'.0", with a depth of 5'.6' at one end and 3'.6' at the other. The dressing-boxes, forty-five in number, are ranged round the two sides. The bath itself is lined on the bottom with white-glazed bricks, and on the sides with white-glazed tiles. The water, kept at an even temperature of 70° F., is, during the summer months, changed once every day. Each dressing-box is fitted with a lock and key, and bathers are supposed to lock their boxes and deliver the key to the attendant before they enter the water.

The second-class bath is arranged in much the same way as the first, but is smaller, being 54'.2"x24'.0". The first-class bath is disused for bathing during the winter months, and the second-class bath only is in use, but the commissioners do not make any other use of the first-class bath during the closed period.

The private, or "Slipper" baths are all on an upper floor, and are 109 in number, divided as follows:

Men, first-class.....	33
Men, second-class.....	54
Women, first-class.....	8
Women, second-class.....	10

The divisions are of slate, with iron framing, and the floor is of the same material. All the baths are of glazed fire-clay, and are fitted with Busby's valves, worked by a crank outside the bath compartment. In one of the compartments of the first-class baths a vapor and douche bath has been fitted up, and one is provided with a shower-bath.

The difference between the first and second-class baths is very slight, the principal one being that in the first-class bath two towels are provided, while second-class bathers are only allowed one.

The wash-house is partly below the street level, and occupies the north-western corner of the site. Accommodation is provided for seventy-eight washers, and to each woman is allotted a compartment about 3'.0' wide, which contains the wash-tub or trough. This trough, which is made of iron, is in two parts, the front part being for washing, the back part for boiling. "Two-way" cocks supply respectively hot and cold water to each part of the trough, while a steam-pipe is laid on the back or boiling-trough. Each washer is provided with a copper-stick, standing-board, and scrubbing-board.

The drying-horses are heated by hot-air to a temperature of 200° F., and although a greater number of horses are available, it is found in practice that one horse to two washers is amply sufficient. The horses are suspended on wheels and overhead-runners. The steam from the drying-closets is conducted into a shaft, so that all condensation within the closet is avoided.

Five hydro-machines worked by steam for extracting the water from clothes are provided for the use of washers, and two mangles; the latter are worked by hand, and the labor has to be supplied by the washers themselves.

There is no provision for ironing.

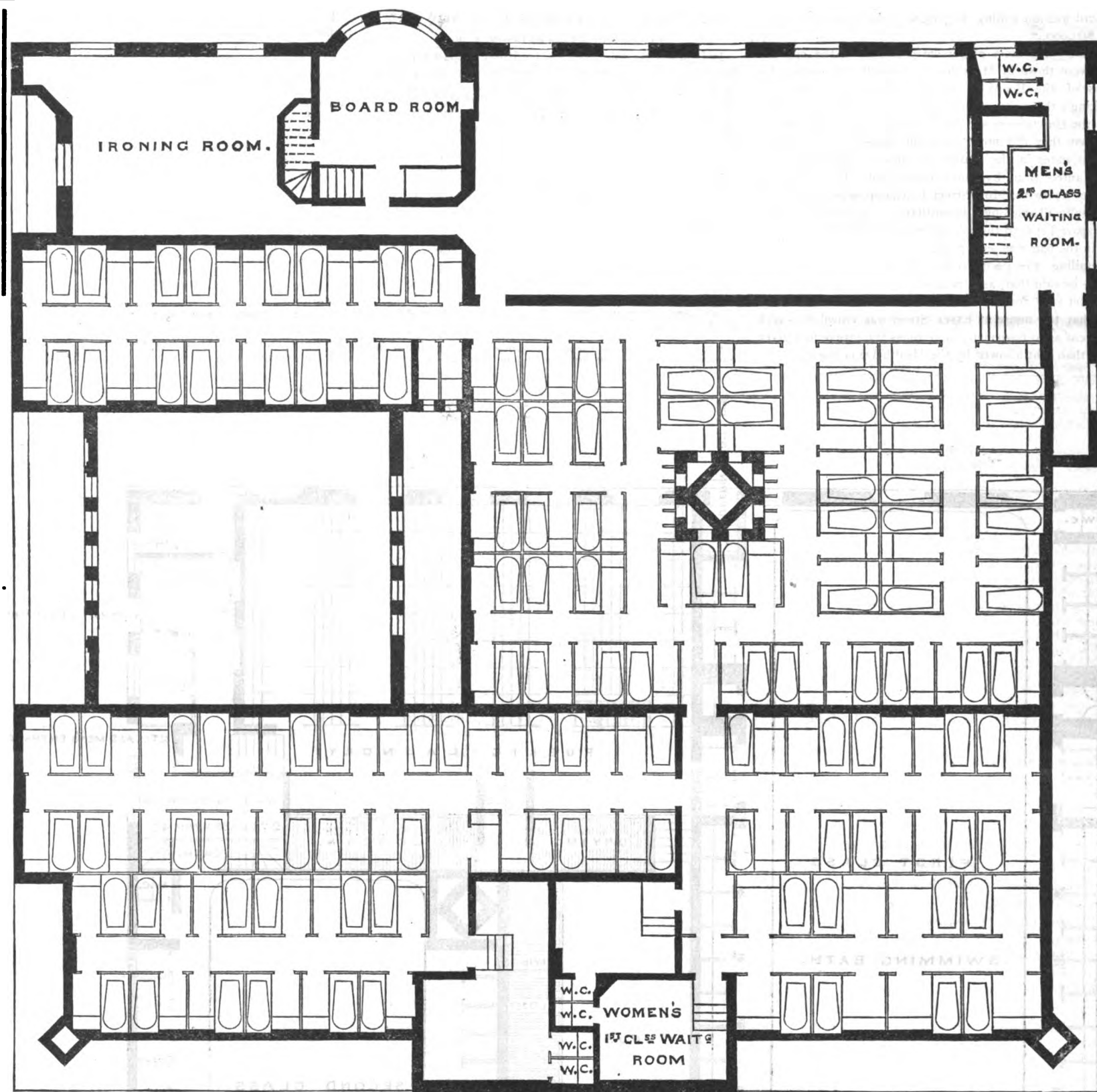
The establishment washing is done in a separate wash-house, in which are two troughs, a "dolly" machine, and a hydro-machine.

The boilers which supply steam and hot water to the whole of the establishment are placed in a basement story under the wash-house. They are four in number, one of them being for steam, the others for hot water. Water is supplied on the constant system by meter from the New River Company's mains. Storage for an amount about equal to one day's supply is provided by a large tank over the roof of the upper story.

The staff of the establishment consists of the following: Superintendent Matron, resident.

Four money-takers (these are women, and work on alternate days).

Two first-class bath attendants.



FIRST-FLOOR PLAN.—ST. PANCRAS BATHS AND WASH-HOUSES, LONDON.

Three second-class bath attendants.
Two women in laundry.
One first-class swimming-bath attendant.
Two second-class swimming-bath attendants.
Two stokers.

The swimming-bath attendants are reduced to one in winter. The stokers are employed doing repairs, not only to the machinery and pipes, but in whitewashing, painting, etc.

The administration both of this and of the King Street establishment is, as compared with many other similar institutions, of a decidedly economical nature. In the year ending March 25, 1883, the accounts issued by the commissioners show a balance on the Whitfield Street establishment of £226 13s. 0½d., and on the King Street establishment of £212 7s. 6½d., and this after paying all charges, including installments of loan and interest. Neither can it be said that this result is obtained by any niggardliness in the conduct of the establishment. That such a result can be obtained reflects great credit both on the commissioners and on their officers.

The cost of the Whitfield Street baths and wash-houses was £35,146 17s. 8d.

(TO BE CONTINUED.)

NEW YORK TENEMENTS.

THE Tenement-House Commission, which acts under Legislative authority to inquire into the condition of the tenement-houses of New York City, met last Tuesday in the office of the Inspector of Buildings, 155 Mercer Street, to take the testimony of owners and hear their experience.

Mr. Henry E. Pellew, of the Improved Dwellings Association, was the first heard. He said that the association to which he belonged had started with a capital of \$300,000, and that it had bought sixteen city lots, upon which thirteen houses were constructed at a cost of \$180,000. They front on First Avenue and Seventy-first and Seventy-second Street, forming a U, the interior of which is an open court-yard. They all have fire-proof stairways, with water-closets on each floor, and sinks and earthen wash-tubs in each apartment, with public laundries furnished with steam, and with public bathing facilities. The rentals charged are from \$6.75 for two rooms on the top floor to \$14 for rooms on the first floor.

The tenants obtained for these houses, Mr. Pellew said, were above the class usually found in tenement-houses. The association calculated to make a net profit of five per cent. out of its investment. It had secured this profit and

\$1,000 per annum surplus. This showed by practical experience that good, clean, healthy accommodations could be given at a low rental and yet a fair margin of profit be secured.

Mr. Pellew closed his testimony by saying that he had noticed in tenement-houses that the conduct of the children had a great instructive influence upon the parents. Parents were quick to adopt habits of delicacy and refinement which they noticed in their children. This imitation, in most cases, sprang from parental affection, which gave a desire not to set any bad example to the children. The witness thought that a kindergarten in connection with a tenement-house would be a most beneficial institution.

Mr. John C. Booth, of the New York Association for Improving the Condition of the Poor, thought the work of the commission was one requiring diligence and patient inquiry. In Jersey Street he knew of two courts in which stood twelve tenement-houses. The rent accruing to the landlord from each of these houses was \$495 per month. The average rent paid by the tenants was \$4 per month per room. The condition of these houses was very bad in every respect. Some years ago the buildings were condemned by the Board of Health, and yet to-day the

landlord was not willing to part with the property for less than \$60,000.

Probably the most overcrowded houses in the city, he said, were those in Mott Street, immediately facing the rooms of the Board of Health. Their condition was shocking; the water-closets were objects of horror. He said the closets were six feet below the level of the street, and that they did not "carry off properly;" that there was no water in the houses, the tenants obtaining what they wanted from hydrants in the yard. In the rear of these overcrowded Mott Street tenements was another row of equally ill-smelling, ill-ventilated, overcrowded hives. The space between the row of houses in the front and the row in the rear was only 7' 9".

Detailing the peculiarities of dwellers in tenement-houses he said that, as a rule, all inquiries that were made were met with reserve on the part of the tenant. He also said that the house 21 Essex Street was crowded to such an extent as to have many more times the people in a given space than that allowed by the Health Department.

SANITARY ENGINEERING AS IT NOW IS.*

BY SIR ROBERT RAWLINSON, C. B.

It is now some thirty years since I first prepared a set of suggestions for the instruction of sanitary engineers, which have been accepted and applied in Great Britain and on the Continent, in British colonies, in British India, and throughout North America. As I have recently revised these suggestions, I propose to refer to them in this address to give it practical value.

Houses should stand on a dry subsoil, and in all cases for the cottage, as for the palace, the area within the walls should be covered by a layer of concrete.

Sites for houses should not be dug into the side of a hill, unless the subsoil is drained and the main walls are effectively isolated from the high ground behind.

All house-walls should, at the foundation or immediately above it, have a damp-proof course to prevent rottenness, which leads to the Levitically-described leprosy.

Sewers and drains should not be formed within the basements of houses.

To every room in a house there should be means for fresh-air ventilation.

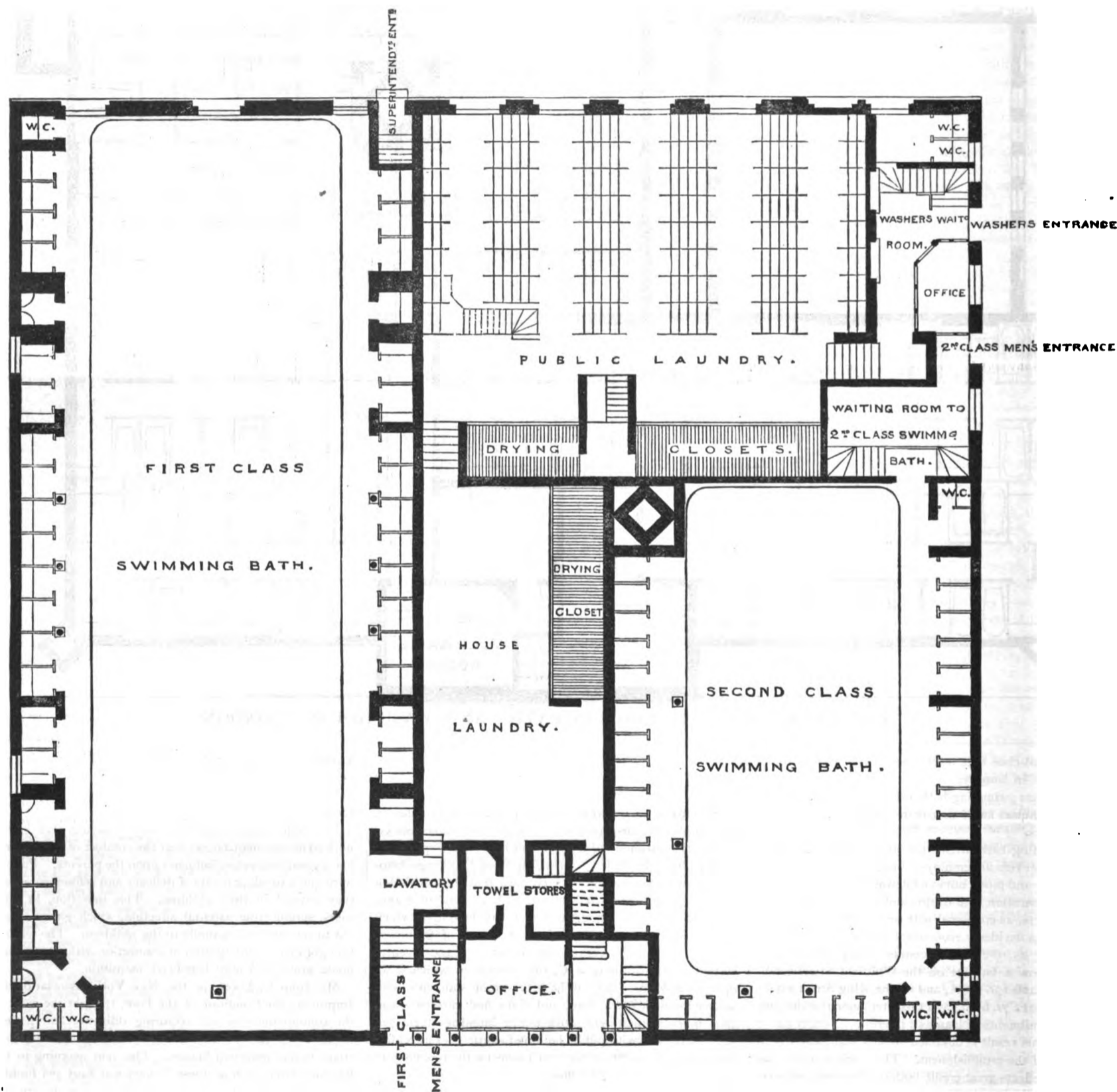
* Abstracted from the President's address at the meeting of the Sanitary Institute of Great Britain at Dublin, September 30.

To every room to be occupied, day or night, there should be means for external daylight.

Refuse should not be stored near any dwelling-house until it becomes putrid, but should be removed at short intervals.

There should be unceasing day-by-day scavenging. Villages, where the cottages are apart, cannot with advantage be sewered as houses in towns are; but they may be surface-drained, and have earth-latrines, to be cleansed each week by a paid scavenger. The payment of one or more shillings per week to a selected resident laborer to be in proportion to the number of cottages.

A clean water-supply is necessary for country cottages. Springs of water may, in some cases, be brought from a distance cheaply by pipes to the centre of the village. The economy of such process may be thus illustrated: A gallon of water weighs ten pounds. Five gallons of water weigh fifty pounds, and 365 times fifty pounds for one year, and fifty cottages in a village, would require this weight, with the weight of the can or bucket added, to be carried from any spring. The total weight would be about 900 tons. This water, if piped, will flow to any convenient point and save to the villagers so much labor. This is a question for the consideration of Boards of Guardians and landlords. I have recently seen in North Wales, on the estate of H.



GROUND-FLOOR PLAN.—ST. PANCRAS BATHS AND WASH-HOUSES, LONDON.

D. Pochin, Esq., J. P., isolated farm-houses fully supplied with water brought half a mile by a pipe half an inch in diameter.

A water-supply to a town should be general. The source should be pure. The water should be filtered and stored in covered reservoirs. The supply should not fall below fifteen gallons per head of the population; it should be at high pressure and constant service. Hand-carried supplies should not be tolerated. There should be full and ready appliances for fire service.

It is practicable to take a supply of water into every yard, every house, and every room-tenement, and to supervise and manage these services so as to reduce waste and bring about economy. This, however, can only be done by unceasing supervision.

Where water is brought in there should be drains and sinks to remove the waste-water. These sink-pipes should not in any instance enter drain or sewer direct, but deliver over a small gully-head connected with a drain.

The true purpose of town-sewering should be to remove all waste-water as generated; to insure a dry subsoil, and so to dispose of sewage as not to cause nuisance.

Main-sewering, as now inculcated and practiced, only dates from about the year 1845.

About 1852 I drew up fresh rules for main-sewering and house-draining, recommending that sewers should be proportioned to the special work they would be required to accomplish.

Natural water-courses were not, as in old Rome and in the city of London, to be formed into sewage conduits.

Surface-water was to be, as much as practicable, discharged by the ordinary water-courses at and over the surface.

Neither sewers nor drains were to be laid within the basements of houses.

House-drains were to range from four to six inches in diameter, and were in all cases to be of earthenware pipes or of cast-iron.

The main-sewers were to be laid in right lines and have true invert gradients; at changes of line or gradient man-holes or lamp-holes were to be formed, having side-entrances on the largest class of sewers, but movable covers on the small sewer manholes. These arrangements were to facilitate inspection and cleansing by flushing. Sewers and drains to be fully ventilated.

Any town sewered and drained on these principles is for all time under the inspection of the surveyor. The sewers, being true in line, can, from manhole to lamphole, be seen through. At the surface, the line of sewer can be sighted from manhole to lamphole, so that the surveyor knows exactly where to sink to find a side-junction.

In the modern sewers side-junctions are to form part of the first construction, so that house-drains may join without any charge of any sort for making such junction.

Sewer and drain flushing with water is necessary to preserve these conduits clean. The automatic-flushing-tank is, therefore, an absolute necessity to the cleansing of drains and sewers. These flushing-tanks—the invention of Rogers Field, one of the leading members of this association—have become an absolute necessity. They accumulate any water turned into them up to the capacity of the tank, which may be from fifty to five hundred, or even five thousand gallons, when, without further intervention, the entire volume of water is liberated at a regulated speed to flush the sewers or drains connected. The tank after each discharge fills again, and repeats the flushing operation at regulated intervals. Service-boxes (small tanks), for flushing water-closets and urinals, are constructed on similar principles.

Sanitary science has been, and is yet, progressive. It is being studied by engineers both in Europe and in North America. In design and execution there are improvements, and, in some instances, the opposite. The complications connected with town-sewering are, however, so many and so various that definite rules to fit all places cannot be formulated. The problem cannot always be in the form of a rule-of-three sum—that is, rainfall, area, and main-sewer capacity.

Engineers having much practice will deal with each area specially, and construct their works so as best and most cheaply to accomplish the desired purposes—namely, to receive and remove waste-water and human excreta to some outlet or outlets where they may be made harmless. Some engineers have thought that the heaviest known rainfall of a district must be provided for; hence, calculations have been made as to capacities of sewers to remove some exceptionally heavy volume of rain within the hour; but if this rule were worked to, main-sewers in our climate, for such populations as Birmingham, would have to be as large as railway tunnels; and for cities in India, such as Calcutta, Bombay, or Madras, main-sewers of the dimensions of railway tunnels would not serve; because rain occasionally falls at a rate of one inch per hour for many hours in succession. The rule may appear absurd to those who have not studied the subject—namely, the heavier the rainfall the less the capacity of the main-sewers should be, as, during the period that such heavy rains continue, the entire surface is swamped—sewers, drains, and streets being alike under water. In countries subject to these heavy falls of rain there may be long intervals of excessive heat and dry weather, when at such times large sewers could only have a small volume of highly concentrated sewage flowing through and evaporating rapidly, leaving sewage-sludge to putrefy and give off deadly gases. Sewers and drains in tropical climates must therefore be confined, in cross-sectional dimensions, to moderate volumes, not exceeding some 150 gallons per head of the population. House-drains in no case need exceed 4 inches in diameter, and for establishments containing 1,000 persons a drain of 9 inches in diameter will be sufficient.

In England some towns having populations up to 10,000 have outlet-sewers from 15 inches to 18 inches in diameter, and these sewers have, in some instances, been worked during the last thirty years, and have neither choked nor burst. Surface-water is not admitted. For valley-lines down which in former times flowed surface-water—small brook courses—the sewers must be of capacity to carry off flood-waters; there must also be overflows to the river, or there must be pumping power to lift and discharge such storm-water above flood-level. But in these cases these surface-water channels ought not to have received sewage. This should have been removed by intercepting drains.

There is a most important law which ought never to be disregarded—namely, do not inclose natural water-courses for main-sewering purposes, because the volume of surface-water flowing down a small brook will be dry, or nearly dry, for long periods, while in storms it may be an angry, rushing torrent; so that, during all dry periods, sewage, if turned in, would stagnate, evaporate, and leave all the slimy deposit to corrupt and become dangerous. That which is true for a tropical climate is, in a lesser degree, true under any other climate.

About the beginning of this century, when water-closets began to be used in better-class houses in London, large, coarsely-made brick drains ramified the basements of houses, and were connected with the flat-bottomed sewers. Sewage—that is, waste-water and excreta—was turned into the sewers, and becoming putrid, foul gases were generated, which, pervading the houses, produced fevers to so serious an extent that house-drain connection with sewers direct was forbidden by Act of Parliament. Then came in the crowning evil—the cesspool. Houses having water-closets were ordered to sever the connection with the sewers, and cesspools were formed in yards and gardens, and beneath basements, to receive the contents of the water-closets; and to this day large, foul brick drains and cesspools exist beneath large old houses in the metropolis, and at mansions of noblemen and gentlemen throughout the country. How many premature deaths have been the result it is not possible to enumerate.

Neither London nor any other English town has ever been cesspooled as Paris is—that is, by such large and costly underground structures, and, as a consequence, the smaller English cesspools have been more easily got rid of; and, since 1848, they have been abolished by tens of thousands, so that London at this day stands sewered, drained, and freed from most of its cesspools, and is in this respect the most fully water-closeted and cleanest great city in the world. The work of entirely freeing the River Thames of sewage from Teddington to the North Sea is merely a question of time, and there will be no further tampering with the question in London; and out to sea also must go the whole of the crude sewage of Dublin, because the River Liffey must be purified, and intercepting sewers having a sea-outlet will be the cheapest remedy. Every large town in Great Britain which is situated on the seashore, or on the margin of a salt-water estuary, sends the crude sewage direct to the estuaries or to the sea, and I know no valid reason against it. There are undoubtedly manurial elements of value in crude sewage, but if it must cost thirty or more shillings to utilize it by deposition with chemicals, or in land irrigation, to earn twenty shillings, I fail to see that to dispose of it into the sea at a less cost in rates is waste.

There are two modes by which inland sewage may be treated to prevent its becoming a nuisance—by disinfection and precipitation, and by broad irrigation. Now, according to the most recent experiments on a practical scale, continued over a series of years, it has been found to cost about £3,000 per annum to disinfect and precipitate the sediment from two million gallons of sewage per day, and the material obtained by precipitation has no paying value.

To treat the sewage of the metropolis, 160,000,000 gallons per day, by chemical precipitation would cost, at a similar rate, about £240,000 per annum, and if carried on at the existing outlets on the Thames would create a great nuisance. At twenty-five years' purchase £240,000 would equal a capital sum of 6,000,000 sterling, which had better be expended in taking the sewage to sea, rather than in further attempting to deal with it inland.

For broad irrigation for London sewage there should be some 40,000 acres of land available, which, at £100 per acre, would cost 4,000,000 sterling, and might cost four more million sterling to drain, form roads, and irrigation conduits; but no such area of land could be purchased for so low a price, if preceding examples are to be a test. It has been found that when land for sewage-irrigation purposes has been taken compulsorily the price has in some cases mounted up to 150 years' purchase, and is never less than three or four times the ordinary selling or letting value for ordinary agricultural uses.

Inland towns and villages, as a rule, are obliged to secure land upon which to effect sewage purification. A long list of such towns and villages might be made out, the chief towns being Birmingham, Wolverhampton, Doncaster, Nottingham, Bedford, Leamington, Oxford, Reading, Warwick, and Croydon. To name all would be to incur this address with a long list of mere names, which can be found in Parliamentary returns, and which is being added to. There are other towns, such as Manchester, Leeds, Wakefield, and Bradford, where sewage is partially removed by sewers and partly by movable pails, and is treated by chemicals to cause precipitation. Irrigation, or filtration through land, produces the purest effluent, and, where suitable land can be procured at a fairly agricultural price, at the least cost to the community.

On the Continent there is sewage-irrigation at Dantzic, which has been in use for some years, and on a large scale it is being adopted in Berlin, where there are large areas of

flat surfaces of land with sparsely-occupied sandy subsoils. To utilize sewage in the easiest and cheapest manner, the sewage should flow on the surface without pumping. The subsoil should be porous, the climate should be dry, and have a large average of sunshine. From such land good management would produce a profit.

Public baths, wash-houses, and disinfecting apparatus should be as near the population for whose uses they are intended as may be practicable. They should be plain in appearance, inexpensive, and fitted up with efficient apparatus. If £20,000 has to be expended in any town, it will be wiser to construct ten separate establishments placed where they are most wanted, rather than to erect one or two imposing-looking buildings to which the poor will not go—one reason being that they are too distant. Examples of the utter breakdown of grand and costly baths and wash-houses may be given. The people for whom they were intended would not use them, and so the money they cost was wasted.

Disinfecting-chambers should be attached to such wash-house establishments, but isolated. That is, infected clothing should be received and washed apart. To stamp out contagious disease, burning or disinfection of infected bedding and clothing should be prompt. It will be the cheapest process to disinfect, wash, cleanse, and restore the articles to the poor owners free of cost rather than retard the process by using compulsion and demanding payment, as in this case there will be secretiveness and opposition; in the other case, ready compliance and thankfulness.

Mortuaries and ambulance conveyances are an absolute necessity in towns, and should be a part of every establishment.

Public abattoirs, situated in open spaces, well drained and ventilated, are necessary. Private slaughter-houses ought not to be permitted.

A fire establishment is necessary; and in towns having a population exceeding 100,000 there may be several stations having electric communication with the head establishment.

SCAVENGERS' DEPARTMENT.—This, I consider, a prime necessity. All forms of scavenging should be under the absolute control of the municipality. There should be no private scavenging. To require householders at any time to scavenge their own premises is a remnant of barbarism, as when it is so left it never has been done, nor ever will be done. Scavenging should be at short intervals, and every spadeful of refuse should be cleared from the streets daily, being taken to some depot. Such of the refuse as will burn should be burned, and other forms of refuse should be harmlessly disposed of outside the town or city. It will be a mistake to retain any refuse which is liable, by keeping, to become offensive, in the hope of selling it to make a supposed profit, as it is not the business of a scavenger to sell refuse, but to produce cleanness. In seaport towns, if refuse cannot otherwise be disposed of, it may be sent to be sunk at sea in hopper barges.

SEWERAGE OF GALVESTON, TEXAS.

THE City Engineer of Galveston, Tex., Mr. E. M. Hart-rick, who in 1880 opposed the discharge of sewage into the gulf, still adheres to the views he then expressed, and looks upon the method pursued for the last four years as affording only temporary relief, and as dangerous. In conversation with a reporter from the office of the *Galveston News*, he expressed his readiness to prepare a plan for sewerage the city properly, if ordered by the Common Council to do so, and to submit such plan to a consulting sanitary engineer. As a reason for preferring this method to that of calling in an "expert" to prepare a plan in the first place, he expressed the opinion "that a specialist or expert has generally a cramped understanding by reason of his limited knowledge of everything not directly connected with his special subject. Most sanitary experts, who make a special study of the subject, support one particular system, which they consider the best, and no amount of reasoning will convince them to the contrary. As I said before, his mind becomes warped."

This is a low estimate of sanitary engineers, for an engineer to express, and we cannot but think that Mr. Hart-rick has had a very limited intercourse with men entitled to be called "experts." A crank who ties himself up to one system for every locality is not a safe adviser with reference to preliminary studies, however valuable his opinion may be with respect to the details of his own specialty. But an engineer of extensive experience and broad views will be more apt in general to give judicious advice as to the general system which should be adopted in a place, than even a resident of the place, whose duties have prevented him from acquainting himself with the experience of every community in dealing with sewage problems. In other words, it is a case where the general practitioner can with advantage consult with the specialist.

THE "Hospital Fête" of the International Health Exhibition yielded about £4,000, and a check for the amount has been sent to the Lord Mayor to be applied for the benefit of London hospitals.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XXII.

(Continued from page 459.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

ELEMENTARY PUBLIC SCHOOLS IN THEIR RELATION TO PROGRESS IN SANITARY SCIENCE.

ONE cannot even pass through the rooms at the Health Exhibition which are devoted to the display of educational systems and appliances without being struck by the great prominence given to the teaching of the elements of natural science, especially in the departments of physics, or, more properly, of natural philosophy and of domestic economy. The exhibits of elementary school-work include museums of objects for the teaching of applied natural science, also examples of apparatus made by pupils, together with specimens of note-books and drawings, and in nearly every case where the curriculum was illustrated some attention was paid to domestic economy, particularly in girls' schools.

The most extensive display of this kind is found in the Belgian section, where a large case is filled with an attractive collection of objects used in the teaching of domestic economy in girls' primary and normal schools. The following subjects are illustrated:

1. Hygiene of the household.
2. Furniture of the house.
3. The food of the family.
4. Clothing of the family.
5. Heating and lighting of the house.

Under the first head are shown models of windows with arrangements for ventilation, various pipes and gutters for carrying water, slates and zinc for roof, hydraulic or water cement for cellars and gutters, a full sized water-closet bowl and pan, with traps, etc. There is also a very complete collection of implements used in keeping clothing, furniture, and floors clean and free from dust, such as dusters of all kinds, leather-thongs and twisted-rattan for beating furniture and clothing. There are mats, pails, and scrubbing-brushes, with a collection of the materials of which mats and brushes are made. The laundry is represented by tubs, washing-boards, and the like, but the most interesting are the neat cards of different soaps, and the ingredients of which they are composed, of wax, indigo, Panama wood, and other accessories, and, best of all, a set of materials used in taking out spots and stains.

The furniture of the house is represented by a model bed and mattresses, with a compartment-box of materials for filling mattresses and pillows, down, feathers, grass, etc.; also samples of covering for the same, samples of woods, furniture coverings, and carpets in great variety.

The equipment of the kitchen is not the least attractive part of the case. A small stove with its pans and kettles, a little cupboard and cooking-table very invitingly set out with bowls, casseroles, tins, and dishes of all kinds, and small sizes of the regular commercial articles, the dainty apron and the neat pile of towels laid ready for use, give an impression of pleasant occupation awaiting the one who shall have the privilege of using them.

The examples of the food of the family include many cards and boxes of material, such as grains, with the flour or meal prepared from them; also the chemicals used in the falsification of bread. There is a very instructive set of the materials used for soups, essences, and condiments for flavoring food, oils, antiseptics, etc., are represented. A very full description of milk is given, and glass tubes, showing the relative proportion of its constituents, together with the apparatus for the detection of adulteration, indicate the scientific side of domestic economy.

The clothing of the family is shown by an extensive collection of tissues of wool, silk, cotton, and fur, each two to four inches square. There is a neat box of sewing materials, needles, and thread; a box of knitting, having specimens of the work in different stages; also some simple embroidery and lace-work.

The heating and lighting of the house is represented by a set of combustibles and of the products of coal, and by an extensive collection of the different kinds of lamps and candles.

Since the specimen cards or boxes were taken from different schools, duplicate sets are often shown to indicate the different ways in which the class will prepare the illustrations.

This case is only one portion of the Belgian exhibit, which is arranged to show the "demonstrative and practical teaching of the elements of natural science and technology."

While this is the most extensive display, every other country represented has something to show in the same line, even the girls' school in Algiers.

In the board schools of England a very complete system of teaching domestic economy in connection with cooking has been developed since the adoption of the new code, and with the sure increase of the popularity and efficiency of these schools an elementary knowledge of the principles of correct living will be widely spread among the poorer classes.

The practical bearing of this teaching on sanitary questions is not shown in the exhibition, except in the case of cookery. It was, however, the good fortune of the writer to spend some days in visiting the board schools of London and of Birmingham, and to hear many lessons in elementary science. It has been said by one well able to judge that science in England had begun at the bottom, and was working its way upward, and after one has found class after class of girls of twelve and thirteen in the board schools to be carefully instructed as to the dangers of drinking pump-water instead of tap-water, and to be shown by diagrams of actual cases in their own neighborhood the way in which refuse matter may find its way into a well, as also to have the character of milk explained, and the reasons why it must be carefully kept, and why it should have a certain quantity of water—pure water—and sugar added to it before feeding the baby with it; when one has listened to all this, and fully grasped the fact that these girls come from the poorest

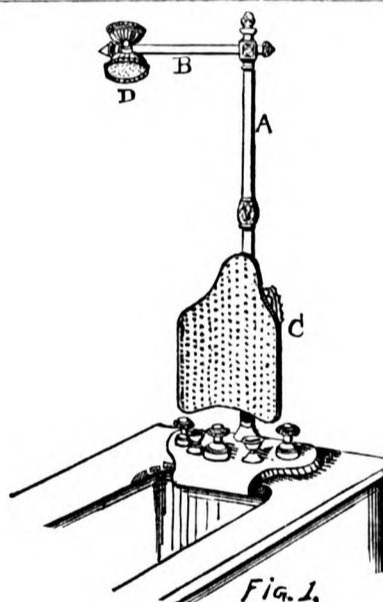


FIG. 1.—See next page.

of homes, where they have the most of the care of the babies, and of what little housekeeping there is done, one is inclined to think that sanitary science, at least, has begun at the bottom.

Of course, not all the board schools are favored with teachers who can judiciously carry out such a system of practical science, but at least half a dozen cities in England are so favored, and the good example is fast spreading. This teaching is already having an effect. Instance after instance is given of the renovation of dwellings as a result of these lessons on sanitary science in the schools, and in the city where the science teaching has been carried out on a uniform system for the last six or eight years it was noticeable that the faces of the little ones in the baby-room were far more pleasing and intelligent than the faces of their older brothers and sisters. This observation was confirmed by the school authorities. The good influence on the home had told on the health and temper of both mother and children.

The cooking lessons are, unquestionably, one of the very best features of the English board schools, and although they are not universal, they are well carried on in nearly all the large cities. The expense is small and the benefit great. The eagerness of the little girls is evident to the visitor, and the home results are testified to by the teachers and the school board. Fathers who were formerly accustomed to spend their evenings in the public-house, and to beat the little girls when they were at home, now come home on the evening of the cooking lesson to see what the child has cooked, and to give her pennies to go out and get

materials for repeating the dish. They will sit by and watch the operation, and then take the child on the knee, and words of unwonted praise and appreciation will reward the small cook.

The influence on the homes of the poor is of untold value, so that while there is danger that much pseudo science and much obsolete theory will be taught, and that the children will get many things distorted, yet, on the whole, the good far outweighs the evil. The people from these homes will be more accessible to reason, in case of

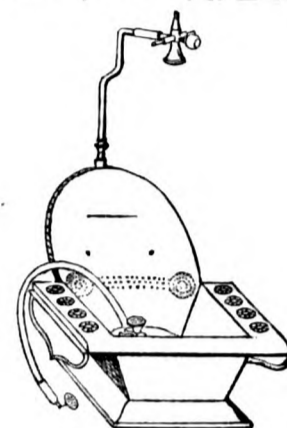


FIG. 2.—See next page.

an epidemic, and not stupidly live on in dirt and terror, as the country people of France have done in this last cholera scare.

America should not allow England to get ahead of her in this matter. The children of our schools are, as a rule, more intelligent at the same age than those of the board schools of England, but they know very little, if any more, of the proper methods of living, and we have many thousands of children who go to school from homes as poor as those in England, and from homes where there may be more money spent, but which are no more comfortable or clean.

The main point which we wish to emphasize is that the science teaching in the board schools, the best of them at least, is applied science; that the dry facts are not given and the application left to chance, but that each fact is fitted in so as to bring some lesson upon daily life, and upon the simplest affairs of the poorest household, as well as the richest. The children are being taught what will make them healthier and happier citizens.

Some physical training is also given. In many schools the Swedish system is used, and in nearly all which are represented in the exhibition, or which were visited, simple exercises are carried out with much eagerness by the children.

One of the pleasantest sights of the summer was that of some 350 little ones under six years of age all keeping time and time with arms and feet to the action songs. In

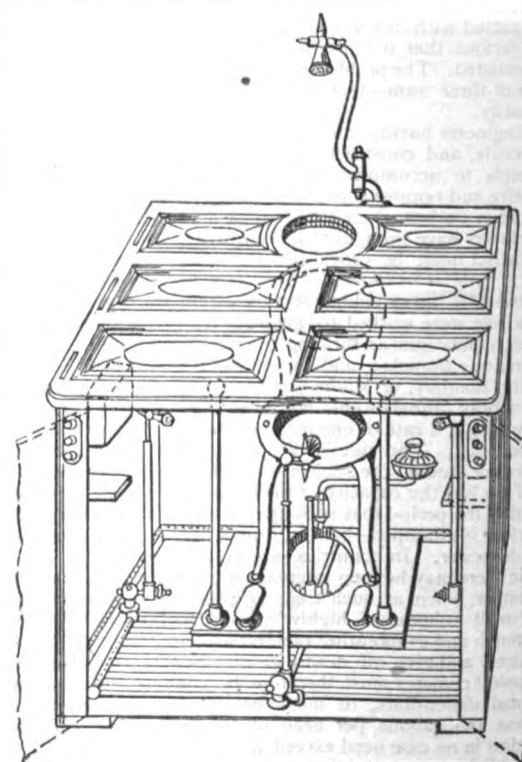


FIG. 3.—See next page.

this way the monotony of school hours is broken, and the reaction of pleasant variety on the mental condition is most beneficial.

EAST CENTRAL GALLERY.

The West Central Sanitary Engineering Co., Leadenhall Street, London, Eng., exhibits a variety of baths at stand No. 939. The plumbers' lead-work exhibit of this firm has been already described.

Figure 1 (preceding page) is a patent apparatus designed by this firm for attachment to a plunge-bath. It consists of a hollow upright, A, with right-angle piece, B, with a rose, D, for shower, and shield, C, for spray.

Figure 2 (preceding page) is Smeaton's patent sitz-bath. The rose in the centre of the seating is removable, and the bath may be used as a douche, shower, or spray.

Figure 3 (preceding page) is an elaborately arranged electric, vapor, spray, or shower bath for medical purposes. It is a complete casing, with a lid opening from the centre on hinges to right and left. The patient sits on a chair. The lid is closed down, an opening being provided so that it fits around the neck. For electrical purposes, pedals are provided for the feet and standards for the hands. The bath is usable in the various styles for which it is designed, either simultaneously or in each department separately.

(TO BE CONTINUED.)

AMERICAN PUBLIC HEALTH ASSOCIATION.

No. II.

(From Our Special Correspondent.)

ST. LOUIS, October 16, 1884.

THE twelfth annual meeting here, Tuesday, of the American Public Health Association will go upon record as a success, both as regards the number of members in attendance and the value of the large number of papers contributed and of the discussions to which they have given rise. The association convened in Liederkrantz Hall, corner of Thirteenth Street and Chouteau Avenue, and was called to order promptly at ten o'clock by the President, Dr. Gihon, of the navy, who is entitled to great credit for his indefatigable efforts to obtain contributions of permanent value upon the various subjects selected for discussion, and also for the efficient manner in which he has performed the duties of presiding officer. The number of old members present is considerably larger than at the Detroit meeting, and more than 100 new members were added to the list upon the first day. How many have since joined your correspondent has not ascertained. Nothing better illustrates the flourishing condition of the association than the report of the efficient treasurer, which shows that notwithstanding the comparatively small number of new members elected last year, and after paying all the expenses of the annual volume, there remains in the treasury a balance of more than twelve hundred dollars. The arrangements made by the local committee are very complete and satisfactory, and the welcome extended to the association by the officials and citizens of the city of St. Louis has been most cordial.

The first business transacted was the reading and adoption of the report of the Committee on Incorporation, which provides that articles of incorporation be obtained under the laws of the District of Columbia. Then followed the report of the Committee on Necrology, which shows that no less than five members of the Advisory Council of the Association have died during the year—viz., Dr. Elisha Harris, of New York, an ex-president and one of the founders of the association; Dr. Charles A. Chamberlain, of Hartford, the efficient Secretary of the Connecticut State Board of Health; Dr. Robert I. Farquharson, formerly a medical officer of the U. S. Navy, and since Secretary of the Iowa State Board of Health; Dr. John Taylor Gilman, of Portland, Me.; and Dr. Hillary Ryan, of Texas. Beside the names of these members of the Advisory Council we find seven others, some of which have been made illustrious by professional skill and literary or scientific labors of the highest order of merit. These names are as follows: Brig.-Gen. John M. Cuyler, U. S. Army; Prof. Willard Parker, of New York; Prof. Samuel D. Gross, of Philadelphia; Surgeon Joseph J. Woodward, of the U. S. Army; Dr. Frederick D. Lents, of New York; Dr. John J. Holbrook, C. E., of New Hampshire; Dr. William F. Sheehan, Health Officer of Rochester, N. Y.; and Dr. Warren Stone, of New Orleans.

The first paper read was on "The Squalid Dwellings of the Poor: a Social and Sanitary Reproach," by Charles W. Chancellor, M. D., Secretary of the State Board of Health of Maryland.

Dr. Chancellor said that the character of the dwellings of the poor had a most important bearing upon the public

health. It was most important that the public should know the existing state of things and apprehend the hazard and risk which was involved by their continuance. If an investigation could be made of the insanitary condition of the dwellings of the poor in the large cities of America, it would reveal a frightful picture of vice and misery. Little had been done to improve the condition of the dwellings of the poor. Science had yet done little to improve their condition. It was well known that the lower classes were much given to intemperance. There was no real reason for that, unless it was that the sense of their misery superinduced the diseased craving for stimulants. It would be well if social reformers would regard intemperance from that point of view, as it was quite certain that the misery and squalor of the poor was largely the cause of intemperance among them. The great industrial classes of the country were entitled to protection, both as regarded their health and their avocations. Therefore it was necessary that there should be vigorously administered laws for the protection of the health of every citizen, and especially over the health of the industrial population should every safeguard be placed. A nation such as this, with 55,000,000 of people and vast manufacturing, industrial, and agricultural interests, should protect the health of its citizens most adequately, as disease paralyzed labor and wasted capital. It should be the primary object of every intelligent Government to prevent disease and to preserve the health and lives of its citizens, and to maintain its whole people in a condition of the highest efficiency for the labors of peace and the struggles of war. Though social reform was in the air, never before was the misery of the poor more intense and their conditions of life more hopeless than at the present time. The courts and alleys of our crowded cities presented spectacles of squalor which were a disgrace to civilization, and which ought to arouse the public to the need for a reform.

The remedy proposed was to make property-owners responsible for sanitary defects, and where extended improvements were necessary to have property purchased at a fair valuation by municipalities for the purpose of making these improvements.

Then followed a paper on "The Hygiene of the Habitations of the Poor," by Major Samuel A. Robinson, A. M., Inspector of Plumbing of the District of Columbia.

This was a practical paper of value and was listened to with close attention by the assembled sanitarians. Major Robinson very properly stated that the poor should be spared the burdens of experiments relating to their habitations. Such experiments should only be made at the expense of the rich. Erection of houses upon damp foundations should be especially prohibited. Cellars should be protected from an influx of ground air by a flooring of Portland-cement at least four inches thick. No boxing of water-closet fixtures, etc., should be permitted, and these fixtures should be of the simplest kind; tenants should not be required to pay for removal of garbage, which should never remain on the premises longer than two days.

Major Robinson remarked that "exceptionally strong powers are conferred upon the health authorities in the city of New York, and yet they have been slow to act in regard to the swarms of Italians, Polish Jews, Chinese, and Irish in some of the tenement-houses in that city, notwithstanding the earnest protests of THE SANITARY ENGINEER, a journal ever foremost in the cause of sanitary reform, and always abounding with information invaluable to every household. The owners of all buildings of this character should be found, and forced either to tear them down or make them habitable. Experience teaches us wherever stringent means have been adopted requiring tenants to occupy other quarters, and to live more in accordance with the customs of civilized beings, that these houses when condemned and unoccupied have soon been leveled to the ground and new, substantial, and healthy houses for the poor have taken their place."

The next paper, by Dr. William K. Newton, Health Officer of the city of Paterson, N. J., was entitled, "The Sanitary Survey of a House."

In the city of Paterson, under Dr. Newton's direction, great attention had been given to the sanitary inspection of tenements, and each inspector was furnished with a blank on which certain questions and directions were printed, giving the necessary qualifications of a perfect house. The degree of sanitary excellence was made up from the reports of officers, who would cross off the qualities a building did not possess and allow those it did to remain. The first thing to be considered was the street on which the house was situated. Was it wide, allowing a free current of air

to circulate, or narrow; well kept or in bad condition; clean or dirty? Streets paved, how? Which way does the house face—north, south, east, or west? (In order to ascertain whether it received much or little sunshine.) Were trees in front of the house? (Trees would be a blessing in a wide street, tempering the rays of the sun, but in a narrow street they would cause disease by obstructing the rays of the sun and making the front rooms damp and unhealthy.) The next point of interest was the yard. Notice whether garbage is allowed to accumulate; the water-supply, and whether there are any sources of contamination; whether domestic animals are allowed in the yard. Then go into the house, visit the cellar and see whether the foundation is of stone, brick, or rubble. The ventilation of a house, method of heating, plumbing (especially leaks in the same) should all be examined carefully. The population of a house, number of families living in it, number in each family, number above five years of age, and the number of rooms to each family, are very important data.

Following the reading of these three papers was a general discussion of the subjects introduced in them, by Dr. Hunt, of New Jersey; Dr. Johnson, of Kentucky; Mr. Brooks, of New York; Dr. Reed, of Ohio; Drs. Bell and Raymond, of Brooklyn; Dr. Devron, of New Orleans; Dr. Bryce, of Toronto, Canada; and Dr. Cook, of Tennessee.

(TO BE CONTINUED.)

SANITARY INSTITUTE OF GREAT BRITAIN.

(Special Correspondence of THE SANITARY ENGINEER.)

DUBLIN, October 1, 1884.

THE annual congress of the above body, which is this year held in this city, was commenced yesterday. The introductory proceedings, a "health exhibition," as usual, is a feature of the congress, and the ceremony of opening this exhibition, by the Right Hon. Lord-Mayor of Dublin, was the initiatory step of the session. It is to be regretted that it has been found necessary to hold the exhibition at a place called Ball's Bridge, situated some twenty minutes' drive from the city. Doubtless had it been found possible it would have conduced to the success of the exhibition had it been held nearer to Trinity College, in the centre of the city, where the congress meetings will be held. The Local Committee is to be commended on its energy and judicious arrangements, whereby the exhibition was really completed by the day of opening. This desirable (and rather unusual) feature was effected by a simple step which might be generally copied with advantage to exhibitors and public—i. e., by having the judging done previous to opening, so that the announcement of awards can be made on the day of opening, leaving as "deferred exhibits" those requiring further tests. The Lord-Mayor, in a happy speech, welcomed the Institute, and touching on home questions, claimed that although much remained to be done, still Dublin might fairly claim that a larger amount of money had of late years been spent on the improvement of its sanitary condition than was the case with most other towns of similar size and importance. He pointed out that improvements in the water-supply and sewerage systems, the clearing away of "slums" and erection of model dwellings, the erection of public abattoirs and baths, had each and all been carried out at great cost. An Act of Parliament had a few years since been obtained for the purpose of carrying out a new main-drainage scheme, but owing to excessive rise in prices, the actual estimates were very greatly in advance of the first estimated cost. The matter was consequently still under consideration.

In the course of the evening Sir Robert Rawlinson, C. B., took the chair at a meeting at which his presidential address was read. It is a matter to be regretted by all that the venerable president finds himself unequal to the labor of delivering such an address personally, and was therefore obliged to depute Dr. Carpenter to read it for him.*

EXECUTIVE COMMITTEE OF THE MASTER PLUMBERS' NATIONAL ASSOCIATION.

(By Telegram to THE SANITARY ENGINEER.)

CHICAGO, October 21, 1884.

THE Executive Committee of the National Association of Master Plumbers was in session at St. Louis during parts of three days, October 16, 17, and 18. There were present Andrew Young, James J. Wade, Alexander Murray, Martin Moylan, Thomas Havey, and J. J. Hamblin, of Chicago; James Allison, of Cincinnati; and W. H. Graham

* A full abstract of the address is printed elsewhere in this issue.

and Jeremiah Sheahan, of St. Louis; also, by invitation, Messrs. George D. Scott and Edward Murphy, of New York, and Mr. Simon Shulhaefer, of Louisville. The visiting committeemen arrived *via* Cincinnati and Louisville, where a banquet was given to President Young, and speeches made, the plumbing-material men also attending. The committee organized Thursday afternoon, October 16, and altogether had six sessions. The first business that came before the meeting was the official announcement that all the manufacturers of the United States, with the exception of three, had signed the Baltimore resolutions. Regarding the New York and Brooklyn and other local resolutions, the committee had nothing whatever to do, it having simply met to represent the national organization. There were interesting essays read on sanitation, and the whole committee were welcomed cordially as brothers of the Public Health Association, that has just closed its annual convention there. A conservative address to the trade was adopted, expressing congratulations and encouraging the work of organization. The apprenticeship question also received attention. Two fine banquets were given by the manufacturers, and several happy speeches made. In these and other social festivities, in which St. Louis hospitality was lavishly displayed, the wives of President Young, Vice-President Allison, and Secretary Wade participated, as also many other ladies. The next meeting will be held in Chicago in January.

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

No. XXV.

(Continued from page 435.)

DRAINS AND TRAPS.

AFTER the trench has been prepared with a concrete bottom, the next thing is to select the pipes, taking care to reject all that have cracks in them, looking particularly to the part where the socket or hub is joined to the barrel. A great many will be found to have holes through them. Pass the hand carefully over the inside surface of the pipe to feel if it is rough; don't be in a hurry over this, or a piece may be cut out of the hand. Next see that the spigot and hub are true, so that the joint can be properly fitted. Any that are very much bent should be laid on one side for curved positions. Very few indeed will be found to be straight; those that are not should be laid so that a perfectly graduated line of fall is at the bottom. Most men are anxious that the drain should look nice and straight in the trench, and they put the bagged part of the pipe downward, as shown at Fig. 5, which is intended as a side view. A moment's thought will enable the reader to understand that in the case of a rather sluggish fall the hollow parts will retain a portion of sewage, and which will then decompose and give off some of the smells most people are anxious to keep out of their houses. If these pipes were properly laid this would be avoided, and although the course of the sewage would be rather serpentine the whole of it would drain away, provided the current of water was sufficient to carry away the solid matter.

After selecting the pipes the next thing is to put them in position, and as many as possible at the same time. The most common way, and which cannot be too strongly condemned, is to put a portion of cement on the bottom of the socket or hub, and then lay in the next pipe. As this pipe is pushed in it forces a part of the cement forward in a body, which stands up in a heap, as shown at A in Fig. 6. This also prevents the end of the pipe from getting home—*i. e.*, to the bottom of the socket—so that a space is left for filth to accumulate in. Sometimes the above cement excess is wiped or scooped out, but very often it is not, with the result of a stoppage that invariably takes place sooner or later, and this is independent of the amount of sewage that is retained by these series of weirs. On looking again at Fig. 6 it will be noticed that another evil is shown, and that is the joint is not true all round; the spigot is hard on the bottom of the hub, which in itself forms a check to the free flow of sewage. The usual way is to now place more cement carefully on the top of the joint where it can be seen, the sides not always being considered of much importance. Perhaps the drain-layer really does take pains that some of the above evils do not take place, and trowels his joint all around, and takes so much time over it that the cement gets nearly set.

The next thing he does is to prepare for and lay in another pipe in the same careful (?) manner, and in endeavoring to get it tight home he jars the last pipe that was laid, and so

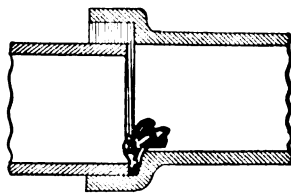


FIG. 6.



FIG. 8.

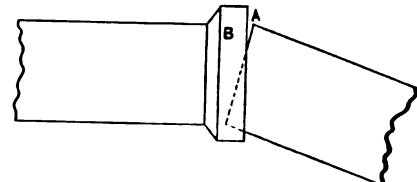


FIG. 9.

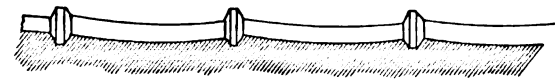


FIG. 5.



FIG. 7.

breaks the joint; but he could not help it, or was so earnest in making the next joint that he did not notice what mischief he had done.

To avoid all the above evils it is best to prepare the concrete bed as described, and while it is still in a soft condition to bed all the pipes on it, and take a crowbar or lever of any kind and force all of them home into the sockets. This applies when there is a long straight length. To insure the joints being fair and true inside it is best to give them one strand of gasket or yarn (tarred is best, as it will not rot away so soon) in each socket, and then as quickly as possible make all the joints in succession with Portland-cement and a very small quantity of clean sharp sand and carefully trowel the surface to a smooth face, and do not be content to smear over a portion with the hands.

Some men use neat Portland for this, but I have had so much trouble with the sockets or hubs bursting that unless the cement is old and nearly dead, I use a small portion of sand. To show the power of Portland-cement, it will be enough to state that I have seen the central portion of a pipe-drain with cement-joints lifted over two inches from the bottom of the trench.

At a bank in Pall Mall, in London, about two years ago, the smells from the drains were so bad that, although they had not long been taken up and relaid, it was found necessary to have them again examined, with the result that there was scarcely a sound joint found in the entire length; nearly every socket had burst with the swelling of the Portland-cement with which the joints had been made.

About six weeks ago a new 6-inch pipe-drain had been laid through a house with good concrete foundation; after an interval of two days it was tested with water, and about half a dozen sockets were found to have split open sufficiently for the water to ooze through. During the laying of this drain, which was in a house near Belgravia, the bricklayer was asked what fall he was giving the pipes. He answered, "Five-eighths of an inch to each 2-foot length." I thought this was impossible, as at that rate he would soon get above the paving with the drain. Thinking he must have made a mistake of about a quarter of an inch, I asked how he obtained so much fall. He proved that he was right, but it was in the manner as shown in sketch, Fig. 7, which is a longitudinal section. On looking closely into this it will be seen that although each individual pipe had that amount of fall, when leveled from end to end the drain would have little or no fall at all; indeed, it could be laid to fall the wrong way, and still be proved by the spirit-level that each pipe had a fair fall in the proper direction. If it is required that the direction of the drain shall be changed, and there is not a properly constructed bend at hand, the usual way is to cut the end of a straight pipe to a level, and get around the corner in that way. The result is that the joint cannot be made in a proper manner, as it is impossible to fit an oval end, as shown by dotted lines, into a round socket, as in Fig. 8. The result of trying to do this is shown in Fig. 9, and it is almost invariably found that there is an opening left, as at A, and a space left inside the socket at B for filth to accumulate.

It cannot be too strongly insisted upon that there shall be no parts where sewage can be caught or retained in any conductor. The inevitable result is decomposition of the matter. Every one knows the unpleasant smell in a room where a neglected night-stool is left, and it is much worse in a close place, such as a drain, where all is in favor, both with regard to moisture and warmth, of the putrefaction of animal excremental matter; and even if it does not gain access to the dwelling it pollutes the air we breathe out of doors.

Any one who has any knowledge at all of drains would be able to form a very clear opinion as to their condition by simply smelling around the top of the ventilation-pipe, and if the drains are trapped or disconnected from the public sewer, and yet he finds an abominable stench issuing from the vent-pipe, he would know at once that something was causing these foul emanations, and as it could not be the materials of which the drains were constructed, it must be from something they contain and which should not have been there, and would not be if they had been properly constructed and plenty of water discharges sent down them. It is a generally accepted fact that if sewage is kept in constant motion no smells will escape from it, but if left in a quiescent state it soon becomes an abomination.

(TO BE CONTINUED.)

Correspondence.

THE SANITARY ENGINEER ON TRADE-PROTECTION.

NEW YORK, October 13, 1884.

To the Editor of THE SANITARY ENGINEER:

YOUR position in the present controversy between the plumbers and manufacturers is, I believe, misunderstood by certain plumbers, who think you are opposed to trade-protection and plumbers' societies. I have carefully read your articles, and can plainly see that you favor trade-protection, but oppose the methods some people have proposed to secure it. Having read your paper for years, and noted your position on all questions affecting plumbers' interests, I must say that I have always been pleased with your defense of plumbers' profits (on which subject you have said so much), and your well-directed efforts for the advancement of the trade. While I believe you have not changed your views, yet in certain quarters efforts are being made to convey the impression that THE SANITARY ENGINEER is opposing what is for the interest of plumbers. I think it would be well for you to explicitly state your position.

Yours truly,

J.

[Our correspondent is correct in his impression of the position of THE SANITARY ENGINEER. It has opposed the trade-protection movement as recently carried on by the National Association of Master Plumbers and certain local associations. It believes that an attempt to regulate the trade of a continent by a committee of men in one section of the country is an impossible task, certain to fail, and certain to raise controversies that injure the plumbing trade.

The condition of the business differs so widely in different sections that what might be practicable for a time in one city would be entirely impracticable in others.

Believing this fact, it holds that the only practical thing for plumbers to do is to conduct their business in accordance with the following suggestion made in our issue of October 9:

"You should advise a plumber to refuse to put up any materials that he is not allowed a fair profit on, and to abstain so far as he possibly can from dealing with any firm which sells goods at wholesale rates to the present or prospective customers of a plumber."

If a wholesale firm solicits plumbing trade, it should protect that trade. If it is an honorable firm, it will do business in accordance with its promises to its customers. If a firm violates its promises, it should, and doubtless will, suffer the penalty inflicted on firms which are known to be tricky. Such firms are not usually successful in doing a first-class business.

THE SANITARY ENGINEER would be sorry to see the master plumbers' associations wrecked. It believes that if there were discrimination as to membership, and their actions were controlled by wise counsels, much good could be done to the craft through their instrumentality.]

SANITARY MATTERS IN ONTARIO, CANADA.

(From an Occasional Correspondent.)

TORONTO, October 16, 1884.

SANITARY matters are progressing quietly in the Province of Ontario, and public opinion is taking an intelligent shape on these important matters. The new Public Health Act, which came into operation on the 1st of July last, makes the Provincial Board of Health the guiding and controlling power, and under the able management of the excellent and indefatigable Secretary, Dr. P. H. Bryce, both act and board are powers for good in the country. Local boards of health are being rapidly organized, and some prosecutions have already taken place. An important case was tried a few weeks ago in a small country town noted for its manufactures. A millowner had placed the privy used by his workmen over a small stream which runs through the town. At this point it is the up-stream end of the first of a series of millponds; on the banks of the lowest pond are some wells used for domestic supply, known to be affected by the rise and fall of the water in the ponds; though these wells are about fifteen feet from the ponds, and the substratum is gravel, it was held that there was pollution. The owner of the privy was fined and ordered to remove it. The case created much local interest, and professional evidence was called in. The prosecution was under the clause which forbids "the deposit into any street, square, lane, wharf, dock, slip, lake, pond, bank harbor, river, stream, sewer, or water, of any manure or other refuse, or vegetable or animal matter, or other filth."

The Local Board of Health in Toronto is making its influence felt, and many insanitary grievances have been remedied.

The Toronto Sanitary Association has commenced its first session. It is intended to bring the importance of sanitary reforms before the public in every way, and chiefly by a course of popular lectures to be delivered in different parts of the city by specialists in the various subjects.

The temperance people are having a splendid crusade in the country places. They must, however, invent some kind of "cinder, just to kill the microbes," before they carry the war into Toronto. The reports on the water-supply by Professors W. Laut Carpenter and Stevenson MacAdam, members of the British Association, who visited the city, call loudly for the use of a "stick" in the drinking-water, while biological studies can be easily carried out in the daily bath-tub. It is to be deplored that the water-supply of this fine city is in such an unsatisfactory condition.

M. D. A.

STREET-SPRINKLING ON THE CONTINENT.

In order to obtain information as a guide for their own future action in the matter of watering the streets, the Munich authorities addressed a circular last February to various Continental (mostly German) towns and cities, requesting answers to three questions:

1. Is the sprinkling done at the expense of the city, and, if so, is it done directly by the city, or by contract with outside parties?

2. Is the water taken directly from the service-pipes, either by means of the fire-hydrants or by means of special sprinkling attachments, or are water-carts used? If carts are used, why are they preferred?

3. Are the fire-hydrants located in the streets or in the sidewalks, and what is the average pressure in the mains?

The replies from thirty-two cities and towns are given at some length in recent numbers of the *Journal für Gasbeleuchtung*. With regard to the first question, in twenty-six out of the thirty-two places the street-watering is done at the public expense, and generally either by the fire or water department. This is the case in all but one of the cities having more than 100,000 inhabitants. In a few cases the water-carts and other apparatus belong to the town, while the horses and drivers are hired by the day or by contract with outside parties. In Augsburg, Erfurt, Darmstadt, Heidelberg, and Stettin the town waters only the public places and the streets in front of the public buildings. Every householder must sprinkle the street before his own dwelling, in Heidelberg twice a day in hot weather.

With regard to the second question, in twenty-two places out of the thirty-two watering-carts are in use. This is the case in Berlin, Dresden, Hamburg, and other large cities. In Augsburg, Cologne, Geneva, Strassburg, and Stuttgart a mixed system is employed, while carts are not used in Dortmund (66,000 inhabitants), Salzburg (28,499), and Zurich (75,956). Danzig and Prague propose in the future to sprinkle by means of hose attached

directly to the hydrants. The reasons given in favor of the cart system are that it causes less interruption to travel and requires less time, less water, and fewer men; moreover, when there is a scarcity of water the carts may be filled from wells or from streams not of the greatest purity. With the hose there is a less regular distribution of water, and where the water is taken directly from the hydrants there may be pressure enough to cause injury to the roadway; again, the hydrants are usually set too far apart.

With reference to the fire-hydrants, the earlier practice was to put them in the street, and are still thus located exclusively in eighteen of the cities and towns. In Bremen, Darmstadt, Frankfurt-on-the-Main, Hanover, and Zurich the hydrants are on the sidewalk, and that system is being adopted in Berlin, Cologne, Strassburg, and other places.

The returns as to the pressure in the mains may be tabulated as follows:

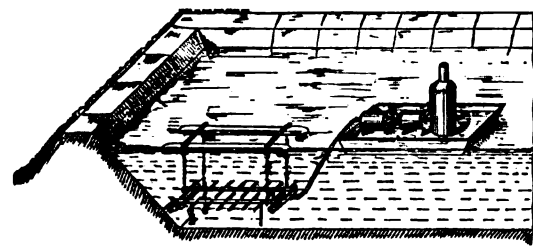
	Average pressure in atmospheres.		Average pressure in atmospheres.
Aachen.....	1-6	Geneva.....	0-4
Altona.....	2	Hamburg.....	3-5
Augsburg.....	3-3.5	Hanover.....	3-5
Berlin.....	3-4	Heidelberg.....	3
Braschiv.....	3-4	Karlsruhe.....	3
Bremen.....	3-5	Leipzig.....	2-3
Breslau.....	3-5	Linz.....	6
Cassel.....	3-4	Lübeck.....	1-2
Cologne.....	3-3.5	Magdeburg.....	2.5-4.5
Danzig.....	2.5	Posen.....	2.5-4.5
Darmstadt.....	3-5.5	Prague.....	3-5
Dresden.....	5-5.5	Salzburg.....	2-7.5
Dortmund.....	5	Stettin.....	2-4
Düsseldorf.....	5	Strassburg.....	3-5
Erfurt.....	3-4	Stuttgart.....	4
Frankfurt.....	2-4	Zurich.....	4-5

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

AERATING DEVICE.

THE accompanying sketch shows a means for purifying water by aeration, proposed and patented by Rudolph d'Heureuse, of No. 196 Broadway, New York. It is intended for use within a reservoir or pond, and consists of a series or system of pipes with perforated branch-pipes at a uniform level below the surface of the water, and at a suit-



able place or places in the reservoir, or if it is preferable, to have such pipe-system attached to a floating frame or float which can be moved about in the reservoir, the pipe-system in either case to be connected directly or indirectly with an air-forcing device ashore or afloat by pipes which may be, according to circumstances, flexible or stationary.

WORCESTER SEWAGE.

THE sewage disposal of Worcester, Mass., and its effect on the unlucky residents along the Blackstone River, is again the subject of a commission, appointed by the Governor of Massachusetts. The Hon. John Quincy Adams, of Boston, is Chairman of the Commission, and civil engineering is represented by Mr. Eliot C. Clark. A public hearing was had on October 2 at Millbury, the town below Worcester, which is affected by the pollution of the river. The same facts and arguments which were presented before the Legislative Committee of 1881 were gone over, and the Commissioners took a drive to see the river for themselves, and then adjourned to another day. That the river is polluted by Worcester there is no question, neither is there any doubt that the pollution is injurious to the riparian occupants below Worcester. It is now simply a question of how long the influence exerted by the rich and powerful city can be made effective in interposing delays and obstacles to its being held responsible for the damage it does. That decency and equity will conquer in the end there can be no doubt, but it will probably be a long and hard fight.

CHECKING WASTE OF WATER IN HARTFORD.

AIMING to check the enormous waste of water from closets, the Water Commissioners of Hartford, Conn., have sent the following communication to the Mayor and Common Council, proposing an extra tax on certain forms of water-closets:

To the Mayor, Aldermen, and Common Council of the City of Hartford:

The Board of Water Commissioners, having adopted the following resolution—viz.: "Voted, that from and after May 1, 1885, hopper water-closets not having self-acting faucets shall be charged at four times the rate of pan water-closets," they respectfully ask your honorable body to make it operative by approving the same. The waste of water, as it is generally used in hopper-closets, is simply enormous, since in most of them it is allowed to run constantly. This prodigious waste can in a great measure be prevented by the use of self-acting faucets, which can be applied at a cost of only \$3 per closet. The present water-rate for a water-closet is three dollars per annum, but if the water, as ordinarily used in this city by a hopper-closet, was passed through a meter, the cost of it by water-rates would be about four hundred and fifty dollars.

In many cities hopper-closets are prohibited; in others the charge for them is so large as to prevent their use; in some places the charge is the same as we now offer for your consideration. We estimate the loss of water by hopper-closets to be from 2,000,000 to 3,000,000 gallons daily, and we deem it proper to state that, unless your honorable body confirm our action respecting these closets, we must extend our capacity for supplying the city with water by building additional reservoirs, or by enlarging the pumping facilities at the Connecticut River. Respectfully submitted, Ezra Clark, J. B. Powell, Valentine Cooper, William B. Clarke, Charles N. Hart, George H. Seyms, Water Commissioners.

[All that is asserted in the above communication about the wastefulness of hopper closets with the usual water-supply is perfectly true, and is another confirmation of the position taken by THE SANITARY ENGINEER on that question, as will be seen by reference to our articles on water-waste prevention in our fifth volume, Nos. 18 to 26. The Water Commissioners of Hartford make a mistake, however, in proposing to rely on self-closing cocks. These do not always "self close;" moreover, when used the flush is certainly inadequate for sanitary purposes. A sudden flush of from two to three gallons, such as can be obtained by the simple double-valve cistern, which is used in Liverpool and other English cities, and which scores of manufacturers in this country are prepared to furnish, as there is no patent on it, is what the Hartford water authorities should encourage their consumers to use.—ED. SAN. ENG.]

THE LIBRARY OF THE INTERNATIONAL HEALTH EXHIBITION.

AN interesting feature of the London Health Exhibition, and one which it is to be hoped will grow into something of permanent value, is the attempt to form a collection of the literature of hygiene and education. The catalogue of the library is evidence that this attempt has been very successful, when we take into consideration the short time allowed for the work, and it is very creditable to the librarian, Mr. C. A. Thimm, whose work can, however, be fully appreciated only by those who have had something to do with collecting and cataloguing books.

It is an old proverb that if one wants to have the conceit taken out of him let him make a catalogue.

As a matter of course the collection to which we refer is very far from being complete. It is composed of contributions from various sources, and includes, for the most part, only recent works, but there are few sanitarians who will not, in glancing over the catalogue, find titles of books or pamphlets of whose existence they were unaware and which they would be glad to consult. We understand that a second edition of the catalogue is just ready for issue, which is much larger than the first, and it is not therefore worth while to comment especially upon the latter.

What is to be the ultimate disposition of the collection is as yet uncertain, but it would seem as if the Parkes Museum were the proper place for it, provided that the managers of that institution have sufficient space and means to properly provide for it.

THE twenty-fifth annual report of the London Drinking-Fountain and Cattle-Trough Association is able to announce the erection of fifty-two new troughs for animals and fifty-one new fountains for human beings. Most of the structures of the society are examined and cleaned by its servants three times a week.

THE practice of condensing and canning milk, instead of manufacturing it into butter, is stated to be spreading extensively in Ireland.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING OCTOBER 11, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.																					
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.																									
NORTH ATLANTIC CITIES.																																													
Portland	Maine	35,000	14	39.8	3	21.4			2	1	2													1																					
Boston	Mass.	435,000	206	47.1	87	42.2	9	1	29	2	30	9		7		4	5		8	1		2		4																					
Lowell	Mass.	71,500	20	28.1	7	35.0		1	3	1	3			1			1																												
Worcester	Mass.	69,000	24	34.8	7	29.1	3		2	1	3			1			1																												
Fall River	Mass.	67,000	27	40.3	11	40.7	1	1	4		6			3			1																												
New Haven	Conn.	69,500	25	36.1	10	40.0			6	1	2			1			2		1			1		1																					
Providence	R. I.	125,000	33	26.4	13	39.3			2		7			3				1	1			1		1																					
Total		872,000	349	40.8	138	39.5	13	3	48	6	53	9		16		4	10	1	10	1		3		7																					
EASTERN CITIES.																																													
Albany	New York	103,000	34	32.8	15	44.1	2	1	6	1	6					1	2			1																									
New York	New York	1,355,000	621	45.8	287	46.2	25	3	100	10	90	22		14	16	5	49		22		6	2		10																					
Brooklyn	New York	225,000	94	41.8	43	45.7	2		5	2	8	4		4	2	2	4	1			6		2																						
Hudson County	New Jersey	225,000	94	41.8	43	45.7	2		5	2	8	4		4	2	2	4	1			6		2																						
Newark	New Jersey	940,000	328	34.9	118	35.9	5	2	45	9	20	28		11	2	5	19	2	3		1																								
Philadelphia	Pa.	50,000	26	52.0	6	23.0	1		3	2	2			2				1																											
Wilmington	Delaware	147,000	50	33.9	26	52.0	1	5	2	2	8	13		2		1	2	1	2	1																									
Total		2,673,000	1,103	41.4	469	42.5	35	6	159	24	126	56		31	20	13	74	4	25	1	6	9		12																					
LAKE CITIES.																																													
Buffalo	New York	105,000	48	45.7	19	39.5	4	2	6		12	2					1	1						1																					
Rochester	New York	210,000	86	40.9	53	61.6	1		4		24	2		8			6				5																								
Cleveland	Ohio	140,000	63	45.0	32	50.7			5	2	12	5		4			1		1																										
Detroit	Michigan	650,000	200	30.8	104	52.0	10	2	14	7	26	13		9	4	4	8	1	7		7			2																					
Chicago	Illinois	147,000	50	33.9	26	52.0	1	5	2	2	8	13		2		1	2	1	2	1																									
Milwaukee	Wisconsin	147,000	50	33.9	26	52.0	1	5	2	2	8	13		2		1	2	1	2	1																									
Total		1,252,000	447	35.7	234	52.3	15	5	34	11	82	22		25	4	5	18	3	10	1	5	8		3																					
RIVER CITIES.																																													
Pittsburg	Pa.	137,000	91	66.4	25	27.4	4		11	1	7			8			7				1			1																					
Cincinnati	Ohio	275,600	89	32.3	28	31.4	4		10		8	2		2			1				1																								
Louisville	Ky.	137,000	91	66.4	25	27.4	4		11	1	7			8			1		2		1																								
Indianapolis	Ind.	94,000	37	39.3	20	54.0	2	2	7		1	2					1																												
Minneapolis	Minn.	100,000	39	39.0	15	38.4	2		3		5	4		5	1	1					1																								
Evansville	Ind.	100,000	39	39.0	15	38.4	2		3		5	4		5	1	1																													
Kansas City	Mo.	375,000	152	40.6	54	35.5	7		9	2	14	17		9	8	1	4	1	4	1				1																					
St. Louis	Mo.	375,000	152	40.6	54	35.5	7		9	2	14	17		9	8	1	4	1	4	1				1																					
Total		981,600	408	41.6	142	34.8	19	2	40	3	35	25		24	12	3	12	1	6	1	1	2		2																					
SOUTHERN CITIES.																																													
District of Columbia	Wh.	133,800	41	30.7	11	26.8			5		3			4	6	1	2																												
"	Col.	69,300	40	57.9	20	50.0	2		7		3			3	1		2		2																										
Richmond	Va.	41,000	15	36.6	5	33.3			1		1			1			1		1																										
"	Col.	32,400	22	68.2	10	45.4			3		1			1	1		1		1																										
Charleston	S. C.	25,000	14	56.0	2	14.2	1		1		2	1																																	
"	Col.	27,800	20	72.1	4	20.0			2		1						1																												
Atlanta	Geo.	30,000	9	30.0	5	55.5			1		2																																		
"	Col.	20,000	16	80.0	7	43.7			1	3	3			2	1																														
Augusta	Geo.	20,000	16	80.0	7	43.7			1	3	3			2	1																														
"	Col.																																												
Savannah	Geo.																																												
"	Col.																																												
Nashville	Tenn.	35,100	14	39.9	5	35.7			2	2	4	3				2																													
"	Col.	21,300	17	79.8	4	35.7			4		4																																		
New Orleans	La.																																												
"	Col.																																												
Total White.		264,900	93	35.1	28	50.1	1	3	9	2	8			5	10	1	1		1																										
Total Colored.		170,800	115	67.3	45	80.1					11	4		6	7		4		3																										
Total in 27 U. S. Cities		6,214,300	2,515	40.5	1,056	41.9	86	17	309	46	315	116		107	53	26	119	9	55	4	12	22		24																					
September 27. Total in 28 English Cities																								8,762,354	3,200	36.5	110					354	24		63		67					48		10	47
" 27. " 8 Scottish Cities																								1,254,607	554	44.2	18					52	14		20		13				8			24	
" 27. " 16 Irish Cities																								858,660	391	45.5	7					26	3		3		14							4	
" 27. " 139 German Cities																																													
" 27. " 15 Swiss Cities																																													
" 27. " 15 Swiss Cities																								455,537	121	26.6	9					11	1		4		1				4		1		

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending October 11, 1884, in 27 cities of the United States, having an aggregate population of 6,214,300, there were 2,515 deaths, which is equivalent to an annual death-rate of 21.0 per 1,000, a decrease of 0.5 from that of the previous week. The deaths under 5 years of age were equal to 41.9 per cent. of the total mortality. The rate in the North Atlantic cities was 39.9; in the Eastern cities 41.2; in the Lake cities 35.7; in the River cities 41.6; and in the Southern cities 40.6.

Accidents caused 3.4, consumption 12.2, croup 1.8, diarrheal diseases 12.5, diphtheria 4.6, typhoid fever 4.2, malarial fevers 2.1, scarlet fever 1.0, pneumonia 4.7, bronchitis 2.1, measles 0.4, and whooping-cough 0.9 per cent. of all deaths. In the Lake cities diarrheal diseases caused 18.3, diphtheria 4.9, and typhoid fever 5.5 per cent. of the deaths. In the North Atlantic cities consumption caused 13.7, diarrheal diseases 15.1, and typhoid fever 4.5 per cent. of the deaths. In the Eastern cities consumption caused 13.7, diarrheal diseases 11.4, diphtheria 5.0, and pneumonia 6.7 per cent. of the deaths. In the River cities accidents caused 4.6, diphtheria 6.1, and typhoid fever 5.8 per cent. of the deaths. In the Southern cities, among the whites, diphtheria caused 4.2 per cent., typhoid fever 5.3, and malarial

fevers 10.6; among the colored consumption caused 16.5, typhoid fever 5.2, and malarial fever 6.0 per cent. of all the deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 30 new cases of diphtheria, 63 of scarlet fever, and 69 of typhoid fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 4 cases of diphtheria and 20 of scarlet fever under treatment October 11.

BALTIMORE, MD.—The weekly report of the Health Officer records 164 deaths, including 67 under 5 years of age. The annual death-rate for the whole population was 20.8 per 1,000, or 20.2 for the whites and 24.2 for the colored. Diphtheria caused 10 deaths, croup 4, whooping-cough 2, typhoid fever 7, malarial fevers 8, diarrheal diseases 15, consumption 27, and violence 4.

MASSACHUSETTS.—During the week ending October 4, in 109 cities and towns of the State, with an aggregate population of 1,412,907, there were 505 deaths, of which 231 were under 5 years of age. The highest rates recorded were 34.0 in Fitchburg, and 33.1 in Fall River. The zymotic diseases caused 130 deaths, among which were diarrheal diseases 70, typhoid fever 21, diphtheria and croup 20, scarlet fever 10, cerebro-spinal fever 9, whooping-cough 8, and malarial fever 1. To consumption were attributed 66 deaths, and to lung diseases 33.

DETROIT, MICH.—Dr. O. W. Wight in his report for September records 207 deaths, of which 176 were under 5 years of age. The annual death-rate for the city was 25.8 per 1,000. Diphtheria caused 14 deaths, croup 6, measles 1, whooping-cough 2, typhoid fever 6, malarial fevers 8, diarrheal diseases 80, consumption 12, acute lung diseases 13, and violence 6.

NASHVILLE, TENN.—The report of the Health Officer, Dr. Charles Mitchell, gives for the month of September 91 deaths of which 49 were white and 42 colored. The annual death-rate was 18.13 for the white, 27.72 for the colored, and 21.84 for the whole population. This rate is low when compared with those of the corresponding months in the last ten years; only in September, 1880, was it lower—viz., 18.46, while in September, 1875, it was 52.67 per 1,000. Diphtheria caused 9 deaths, croup 4, whooping-cough 1, typhoid fever 10, malarial fevers 8, diarrheal diseases 17, consumption 9, and violence 4.

CHICAGO, ILL.—The report of the Health Officer, Dr. M. K. Gleason, for the month of September records 1,012 deaths, which is 47 less than the average of the corresponding months of the past 4 years. The death-rate was 19.2 per 1,000. Of the decedents 575, or 56.8 per cent., were children under 5 years of age. Diphtheria caused 44 deaths, croup 9, scarlet fever 16, measles 12, whooping-cough 13, typhoid fever 36, malarial fever 6, diarrheal diseases 254, consumption 72, and violence 62.

HUDSON COUNTY, N. J.—During the month of September there were 411 deaths, of which 200 were under 5 years of age. The annual death-rate was 23.7 per 1,000, a slight increase over the average of the corresponding months of the past 7 years. Accidents caused 19 deaths, consumption 55, croup 10, diarrheal diseases 46, diphtheria 4, typhoid fever 4, malarial fever 2, scarlet fever 12, pneumonia 15, and whooping-cough 1.

ENGLAND.—The Registrar-General's return for the 28 large towns of England and Wales during the week ending September 27 gives the annual death-rate as 19.1 per 1,000. The highest rate recorded was in Pres-

IRELAND.—For the week ending September 27, the death-rate in the 16 principal town districts was at the rate of 23.7 per 1,000 annually.

Dublin.—Deaths, 200; annual death-rate, 29.6 per 1,000. Scarlet fever caused 11 deaths, whooping-cough 3, diphtheria 3, typhoid fever 3, diarrhoea 16, consumption 28, acute lung diseases 25, and violence 4.

Belfast.—Deaths, 80; annual death-rate, 19.2 per 1,000. Scarlet fever caused 3 deaths, diarrhoea 5, consumption 10, acute lung diseases 13, and violence 1.

FRANCE—Rheims.—September 21-27: Deaths, 53; annual death-rate, 29.3 per 1,000. Diphtheria caused 2 deaths, typhoid fever 2, consumption 5, diarrhoeal diseases 20, and violence 2.

Paris.—During the week ending October 2 there were 806 deaths, a decrease of 116 as compared with the previous week. The annual death-rate was 19.3 per 1,000. The most marked decrease among the zymotic diseases was shown by typhoid fever, which caused 18 deaths, against 48 for the previous week. Measles caused 13, scarlet fever 4, diphtheria 23, whooping-cough 3, diarrhoeal diseases 26, consumption 193, bronchitis and pneumonia 42, and violence 24. On September 28 there was in the hospitals under treatment 6 cases of small-pox, 40 of diphtheria, and 476 of typhoid fever.

GERMANY—Dresden.—September 7-13: Deaths, 104; annual death-rate, 22.9 per 1,000. Diphtheria caused 3 deaths, whooping-cough 4, typhoid fever 1, measles 1, consumption 14, diarrhoeal diseases 13, and violence 1.

September 14-20: Deaths, 132; annual death-rate, 29.1. Diphtheria caused 7 deaths, whooping-cough 3, scarlet fever 1, typhoid fever 2, diarrhoeal diseases 16, consumption 21, and violence 4.

DENMARK—Copenhagen.—September 17-23: Deaths, 141; annual death-rate, 27.6 per 1,000. Measles caused 7 deaths, croup 1, whooping-cough 7, typhoid fever 2, diarrhoeal diseases 15, consumption 15, and violence 2. During the week there were reported 28 new cases of measles, 15 of scarlet fever, 15 of diphtheria, and 15 of typhoid fever.

Association News.

THE CHICAGO MASTER PLUMBERS' ASSOCIATION met October 15, President Edward Baggot in the chair, and William Oliphant, secretary. Messrs. Corboy, Watt, and Clark, as a committee on hours of journeymen for the winter months, recommended that from the first Monday of November until the first Monday of March, nine hours to be a day's work. So ordered, and the Secretary was instructed to so notify the Secretary of the Journeymen Plumbers' Association. A visiting *frater* from Bay City, Mich., at one time a pioneer plumber of Chicago, Mr. John Young, alias "Old Jack," told some well-received reminiscences of the early days, and mentioned among other Chicago veterans Father Raffin, Kenney & Keeney, Jim Eels, Harry Burns and George Bigden. In conclusion he asked how plumbers' organization was to be effected in county towns and cities like East Saginaw, Saginaw City, Bay City and Jackson, Mich., where there were only one or two master plumbers apiece. Though personally it might not benefit him, he wanted organization to take place for the future developments of the trade, and he thought he spoke the sentiments of all other plumbers cut off by themselves as he was. Answering him State Vice-President T. C. Boyd said he would advise him and all plumbers similarly situated to join the regular association in the nearest city where there was one. This was the effort that was being made in 15 or 20 towns in Illinois, and with good success. In such cases personal attendance might seldom, if ever, be practicable, but nevertheless there would be a real communication and fraternal relationship, and in the State Vice-President's opinion the day was not far off when even master plumbers in Illinois would be thus affiliated. As a result of the interesting interchange of views, the Detroit Master Plumbers' Association will doubtless receive a new member, and it is thought such a veteran's action will be followed by other "Wolverines." A feature of the well-attended meeting was the absence of a number of habitual attendants, they being off at the St. Louis meeting of the National Executive Committee, most of them having traveled there *via* Cincinnati in response to a cordial invitation from the craft in that city. However, President Andrew Young only went on the night before the meeting, and then directly to St. Louis, he being detained in Chicago by private affairs. At the adjournment it was remarked by one of the plumbers that the proposed address to the trade from the National Executive Committee had been put off until after the St. Louis meeting.

PHILADELPHIA ENGINEERS' CLUB.—At the meeting October 4, Past-President Frederic Graff in the chair, and twenty-one members

present, the Board of Directors presented their minutes as the report of routine business transacted since the last business meeting and made a special report of a communication from the Association of Engineering Societies. This communication cordially invited the club to unite with the association and publish its proceedings with those of the societies now members thereof. The board had considered it, and had unanimously decided that no change in the present policy of publication was advisable, but referred the matter to the club, that a more general expression of opinion might be obtained. The meeting sustained the action of the board, without a dissenting vote, and instructed the Secretary to notify the Association of their action, and to assure them of the high appreciation of their courtesy and consideration, and of the standing and value of their publication. A communication from the New York and New Jersey Branch of the International Institute for Preserving and Perfecting Anglo-Saxon Weights and Measures, requesting assistance in promoting the objects of the institute, was presented and laid upon the table. Communications from the American Institute of Mining Engineers and from their Local Executive Committee, conveying their thanks to the Engineer's Club for the pleasure conferred at their recent meeting in Philadelphia, were received and filed. The thanks of the club were returned to Hon. William B. Smith, Mayor of Philadelphia, for the Report of the Board of Experts on Street Paving, Philadelphia, 1884, and to Mr. John McArthur, Jr., Architect of the City Hall, Philadelphia, for the phototypes of that building, which documents these gentlemen had kindly placed at the service of members desiring them; and, also, to Capt. S. C. McCorkle, member of the club, assistant in charge of Philadelphia Office of U. S. C. and G. Survey, for his considerate invitation to the members to make use of the special facilities for information, as to this branch of Government work, afforded by his office. The secretary presented, for Mr. S. N. Stewart, a description of a gravity elevated railway. The tellers of election reported that the following gentlemen had been elected active members of the club: Messrs. S. C. McCorkle, Edward H. Williams, D. C. Barber, O. E. Michaelis, J. B. Hutchinson, C. R. Claghorn, Harry C. Smith, F. H. Bowen, Jr., W. B. Riegner and John Birkenbine.

PROVIDENCE MASTER PLUMBERS.—A special meeting of this association was held Thursday evening, October 16, Mr. Thomas Phillips presiding. The attendance was not large, a fair number only being present. Some matters of a local nature were presented and acted upon, and the subject of the meeting was taken up as laid over from last meeting—viz., "Contract-Work," and discussed with great spirit, but no definite action taken. Papers were read by Messrs. E. F. Carey, J. C. Conroy, and James Davis, which were very interesting to the members present. A motion was passed that the association express its thanks to the gentlemen for the essays. One proposal for membership was handed in, and one new member joined the association. The association seems to be in a flourishing condition, and it is found that by having semi-monthly meetings the interest of the members is kept up. Several subjects of importance are to be presented for the consideration of the members at their future meeting.

MILWAUKEE MASTER PLUMBERS.—The following are the new officers of the Milwaukee Master Plumbers' Association: William E. Goodman, President; L. H. Plum, Vice-President; George A. Spence, Secretary; R. J. Finn, Treasurer, and H. C. Apel, Sergeant-at-Arms.

Notes.

CONSTRUCTION.

WATER-WORKS are contracted for at Plunkington, Dak.

AT a test of the iron girders of the Washington Light Infantry Opera House, October 15, Inspector Entwistle expressed himself as satisfied. The girders are furnished by the Phoenix Iron Company of Trenton, N. J., and, as stated in our last issue, the inspector had required that the girders should stand certain tests, which they have now been subjected to.

READING, PA.—The County Commissioners on the 15th inst. agreed with the Pennsylvania Schuylkill Valley Railroad for the building of a bridge at Penn Street, the city to pay \$33,000.

EAU CLAIRE, WIS., has voted to bond itself for \$40,000 to build three bridges across the river at that point.

CHESTER B. DAVIS, of Chicago, has planned a system of water-works for Mason City, Iowa, to cost \$40,000.

LACONIA AND GUILFORD, N. H., unite in establishing a system of water-works. The engineer of the works, of which the preliminary surveys are now being made, is Almon A. Platts, of Lake Village, N. H.

HYDE PARK, ILL.—A storm on the morning of the 8th inst. washed away the piling and a cabin for working at the inlet crib of the water-works tunnel. Fifteen persons were thrown into the lake, and ten perished.

STEEL-PIPE CONTRACT.—A Buffalo press dispatch of the 12th inst. states that Charles Kellogg, formerly President of the Kellogg Bridge Works, Buffalo, has just closed a contract with a New York syndicate to furnish 50,000 tons of steel pipe, to be of 36, 40, and 48 inches diameter, delivery to begin within six months, and the contract to be filled within two years. The pipes are patented by Mr. Kellogg both in Europe and the United States. The total amount of the contract is \$4,000,000.

VALUATION OF CORPORATION WATER-WORKS.—An important decision was issued October 3 by Lord Kinnear, in the Court of Sessions, Edinburgh, in joint appeals by the Corporations of Edinburgh, Glasgow, Dundee, Aberdeen, and Dunfermline, as to whether their water-works were subject to valuation. Lord Kinnear finds that in fixing the annual rent or value of the water-works a deduction should be made from the gross revenue of all necessary outlays for management, maintenance, and repairs, which are properly chargeable against revenue. To this extent he sustains the appeal, but otherwise dismisses it, and remits to the assessor to amend the valuation.

CLINTON, N. Y.—In our last issue we referred to a decision of the Supreme Court that the Water Commissioners were not a regularly organized body, and consequently without any authority. It appears from interviews with several of them that this decision will not at once, at least, stop the progress of constructing water-works which they have begun. The commissioners intend to proceed as rapidly as possible with the work. The contract was let to D. S. Read, of Canajoharie, for a little less than \$27,000, and the work is over half completed, about two-thirds of the supply-pipe being already in the ground. The pipe is distributed in nearly all the streets of the village.

BIRMINGHAM, ALA.—A good story comes from here. Reports have been circulating all about that there is a great underground river beneath this city, and a "cute" Selma ducky advertised an excursion, with a ride on the river as an attraction. Excursions came to Birmingham by hundreds, and spent the hottest day of the season looking for the hole to the subterranean channel where the steamer lay. They did not find the hole, and the ducky has not returned to Selma.

MR. G. NORMAN WEAVER and Mr. W. W. Cole, of the Newport Water-Works Company, are making surveys for the completion of the company's works at Green End. The work to be done in that locality will be finished in two months.—*Newport (R. I.) News*.

THE Hartford (Conn.) Courant says that the water consumption in that city amounts to 150 gallons daily for every inhabitant.

ALNWICK, ENG., WATER-SUPPLY.—The water-supply of Alnwick having been unsatisfactory during the recent dry season, the local authorities have instructed Mr. J. P. Spencer, C. E., of Newcastle-on-Tyne, to report upon the subject, and advise them as to the best means of providing a sufficient supply, and also with a view of providing additional storage and enlargement of the present water-works.

THE Secretary of the Treasury has directed that the contract made with George W. Thomas, of New York, for raising the wreck of the British frigate *Hussar*, which was sunk in the harbor of New York in 1780, be annulled, and that a new contract to raise the vessel be made with Messrs. Bean & Hartwell, of Providence, R. I., on the same terms. The contract with Mr. Thomas was terminated on the ground that he did not use due diligence in the prosecution of the work. The new contractors represent the persons who have already advanced money to carry on the work, and who are willing to push it to completion. It is represented that the frigate contained about \$5,000,000 in English money when she sank.

By the terms of the contract the Government is to receive all the relics and 10 per cent. of all the money which may be recovered.—*N. Y. Times*.

CONTRACTS AT THE NEW ORLEANS EXHIBITION.—The Keystone Bridge Co., of Pittsburg, has the contract for a large iron pavilion, to be erected by the Mexican Government, at a cost of \$100,000. Jones & Laughlin have been awarded the contract for all the shafting in the main exhibition hall, amounting to \$150,000, and Hoover, Hughes & Co., have contract for a large wooden building known as the Mexican Barracks. Both these last-named firms are also of Pittsburg.

HAMILTON, ONT.—The building of a new sewer is now a live question in this place, and a meeting of citizens has been held to discuss the propriety of expending \$103,450 on sewers, as the City Council has proposed.

THE Storm King bridge project of bridging the Hudson River is reviving. A new board of directors has been chosen, which includes the Hon. J. Andrew Pickett, Mayor of New Britain.

THE Mississippi Valley Railroad has plans for a railway tunnel 700 feet long, south of Vicksburg.

SPRINGFIELD, MASS.—Springfield is this year laying a \$25,000 brick sewer on Worthington and Dartmouth Streets. They have an elevated tramway, worked by steam, for moving the earth, and lay about 32 feet of sewer per day. The sewer is from 17 to 22 feet below the surface.

BROOKLYN.—A communication from City Works Commissioner Fleeman was read October 20 before the Board of Aldermen, notifying to them the completion of the preliminary work of extending the water-works, and asking for authority to issue \$500,000 in bonds for the purpose of buying 2,211 acres of land on Long Island. The matter was referred to the Committee on Water and Drainage.—*N. Y. Times*.

ASBURY PARK, N. J.—Proposals to erect water-works for the borough of Asbury Park will be received by C. T. Bailey, Clerk of the Board of Commissioners, Asbury Park, N. J.

ST. THOMAS, ONT.—Mr. Tracy, civil engineer, is examining springs four miles from this place, from which it is proposed to obtain a supply of water. He thinks a sufficient quantity can be thus obtained, and estimated the cost of the necessary works at \$100,000.

BUFFALO, N. Y.—The Street Committee of Council has awarded a contract for paving Lewis Street with second-class Medina stone to A. M. Holloway, at \$6,272.

PITTSBURG, PA.—The contract for rebuilding the U. S. beacon-light steamer *Lily* was let on Monday to the Madison Marine Ways. Price \$10,800, and the work is to be completed in 65 days from the date of contract.

GOVERNMENT WORK.

LIFE-SAVING STATIONS.—Charles M. Cornell, of San Francisco, Cal., has received the contract for building a keeper's cottage at Golden Gate Park for \$1,590. Bids for cottages at Shoalmaker's Bay and Cape Disappointment, Washington Territory, have been received and new proposals will be called for.

OAKLAND HARBOR, CAL.—Proposals for dredging tidal basin: Ed. G. Lukens, Oakland, Cal., 11 95-100c., per cubic yard. Edgar W. Emerson, San Francisco, Cal., 13c., per cubic yard. Alexander W. Von Schmidt and John H. McNee, San Francisco, Cal., 16 2-10c., per cubic yard. Thomas H. Williams, Jr., Undine, Cal., 17c., per cubic yard. G. L. Long, Mobile, Ala., 17 1/2c. per cubic yard. The contract has been awarded to Ed. G. Lukens.

SHEEPSHEAD BAY, N. Y.—Proposals for dredging: John McDermott, Cohoes, Md., 57c. per cubic yard. J. H. Fenner, Jersey City, N. J., 39c. per cubic yard. Elijah Brainard, Jersey City, N. J., 24 1/2c. per cubic yard. Edgar M. Payn, Albany, N. Y., 46 1/2c. per cubic yard. Atlantic Dredging Company, Brooklyn, N. Y., 13 1/2c., per cubic yard. Contract awarded to the Atlantic Dredging Company.

CURRITUCK SOUND, N. C.—Proposals for dredging: Thomas P. Morgan, Washington, D. C., 26c. per cubic yard. H. E. Culpepper, Portsmouth, Va., 24c. per cubic yard. George E. Ward, 1001 Maryland Avenue, S. W., Washington, 14 1/2c. per cubic yard. James Caler & Son, Norfolk, Va., 29c. per cubic yard. Contract awarded to George E. Ward.

KANSAS CITY, MO., CUSTOM HOUSE.—Bids opened October 14, for joiner's-work and wood-flooring: Street & Chambers, Kansas City, Mo.—1, \$31,456; 2, \$31,456; 3, \$33,456; 4, \$35,456; 5, \$2.25 per lin. ft.; 6, \$2.25 per lin. ft.; 7, \$2.75 per lin. ft.; 8, \$3.25 per lin. ft.; 9, \$1,458; 10, 37c., per square. W. B. Everhart, Kansas City.—1, \$33,900; 2, \$33,900; 3, \$35,900; 4, \$39,000; 5, \$5; 6, \$5; 7, \$5.50; 8, \$6; 9, \$1,950; 10, 50c. per square. Smith, Sargent & Co., Topeka, Kansas.—1, \$19,022; 2, \$19,022; 3, \$21,222; 4, \$22,722; 5, 84c.; 6, 84c.; 7, \$1; 8, \$1; 9, \$1,557; 10, 14.45 and 8 per square. Robert Mitchell Furnishing Company, Cincinnati Ohio.—1, \$23,200; 2, \$23,100; 3, \$24,207; 4, no bid; 5, \$3.25; 6, \$3.20; 7, \$3.30; 8, no bid; 9, \$3,251.34; 10, \$18. Jos. Thomas & Sons, Baltimore, Md.—1, \$22,238; 2, \$22,238; 3, \$23,293; 4, no bid; 5, \$2; 6, \$200; 7, \$2.20; 8, no bid. Made no bid on wood flooring.

DAMS AND DIKES ON THE OHIO RIVER. *Merriman Bar*.—John B. Holbrook, Lebanon, O., \$23,227.66; I. V. Hoag, Pittsburg, Pa., \$23,532.16; Simon Carmody and Robert L. Mapel, Cincinnati, O., \$26,449.65; C. B. Willey, Allegheny City, Pa., \$27,718.66; Jacob Friday, Pittsburg, Pa., \$27,739.70; Porter, Tucker & Mahan, New Cumberland, W. Va., \$28,650.47; John Swan, Allegheny City, Pa., \$30,917.02; R. G. Huston & Co., Cincinnati, O., \$31,181.52; Edwin E. Graham, Etna, Pa., \$34,696.46; William B. Rogers, Pittsburg, Pa., \$34,722.85; Jonte, Barton & Crane, Cincinnati, O., \$35,755.70; Merrington & Jutte, Pittsburg, Pa., \$36,104.87; J. Sharp McDonald, Pittsburg, Pa., \$43,965.75; C. J. McDonald & Co., Pittsburg, Pa., \$45,441.78. Contract awarded to John B. Holbrook. *Block Island*: J. B. Holbrook, \$24,098.02, bid withdrawn; Porter, Tucker & Mahan, \$30,150.25; I. V. Hoag, Jr., \$30,360.01; C. B. Willey, \$31,236.94; Simon Carmody and Robert L. Mapel, \$31,573.90; Jacob Friday, \$36,174.42; R. G. Huston & Co., \$39,607.42; John Swan, \$40,776.35; A. J. Jolly, Sons & Co., Pittsburg, Pa., \$47,207.75; Jonte, Barton & Crane, \$48,195.35; Edwin E. Graham, \$49,002.29; Merrington & Jutte, \$49,879.73; C. J. McDonald & Co., \$54,450.04; T. S. Freeland, Robella post-office, Pa., \$181,926.40; Contract awarded to Porter, Tucker & Mahan. *Wheeling Island*: 3,000 cubic yards excavation. I. V. Hoag, Jr., \$25,487.22; C. B. Willey, \$26,878.22; Porter, Tucker & Mahan, \$27,237.10; Simon Carmody and Robert L. Mapel, \$29,436.38; Prince & Kuglen, Wheeling, W. Va., \$30,308.98; Edwin E. Graham, \$34,744.16; Jonte, Barton & Crane, \$36,837.82; Kelly & Ryan, Fairmont, W. Va., \$39,396.28; C. J. McDonald & Co., \$40,070.57; Arnold S. Radford, Wheeling, W. Va., \$42,113.20; J. Sharp McDonald, \$50,071.17; J. C. Wilkins & Co., Uhricksville, O., \$79,822.81. Contract awarded to I. V. Hoag, Jr. *Captina Island*: John B. Holbrook, \$17,142.25; I. V. Hoag, Jr., \$21,210.57; R. Merydith & Sons, Marietta, O., \$21,414.81; Dawes, Irish & Co., Marietta, O., \$21,452.45; Porter, Tucker & Mahan, \$21,601.60; McGrath & Fickinger, Kingsville, O., \$22,709.53; Simon Carmody and Robert L. Mapel, \$23,509.39; R. G. Huston & Co., \$25,173.46; John F. King, Belpre, O., \$26,779.49; Edwin E. Graham, \$29,618.85; Jonte, Barton & Crane, \$33,476.45; C. J. McDonald & Co., \$34,317.55; A. J. Jolly, Sons & Co., \$35,301.86; J. Sharp McDonald, \$40,755.18. Contract awarded to John B. Holbrook. *Fish Creek Island*: John B. Holbrook, \$18,184.35; I. V. Hoag, Jr., \$21,210.51; R. Merydith & Sons, \$21,414.81; Dawes, Irish & Co., \$21,452.45; Porter, Tucker & Mahan, \$21,601.60; McGrath & Fickinger, \$23,123.14; Simon Carmody and Robert L. Mapel, \$23,509.39; John F. King, \$24,059.84; R. G. Huston & Co., \$26,215.46; Edwin E. Graham, \$29,798.85; Jonte, Barton & Crane, \$30,761.45; C. J. McDonald & Co., \$34,317.55; A. J. Jolly, Sons & Co., \$35,736.75; J. Sharp McDonald, \$40,617.18. Contract awarded to John B. Holbrook. *Three Brothers Island*: John F. King, \$27,209.07; Dawes, Irish & Co., \$28,383.51; C. M. Cole, Marietta, O., \$28,470.95; I. V. Hoag, Jr., \$29,210.25; R. Merydith & Sons, \$29,133.92; Porter, Tucker & Mahan, \$30,133.92; McGrath & Fickinger, \$30,731.22; Simon Carmody and Robert L. Mapel, \$33,192.31; R. G. Huston & Co., \$35,374.63; J. Sharp McDonald, \$37,084.16; Jonte, Barton & Crane, \$40,776.60; Edward Graham, \$42,070.80; A. J. Jolly, Sons & Co., \$45,762.42; C. J. McDonald & Co., \$50,159.10; J. M. Stum, Little Hocking, O., \$57,755.68. Contract awarded to John F. King. *Sand Creek*: J. C. Graham, Gallipolis, O., \$16,545.62; C. M. Cole, \$17,966.78; I. V. Hoag, Jr., \$19,877.52; Porter, Tucker & Mahan, \$20,430.68; Simon Carmody and

Robert L. Mapel, \$21,898.47; R. G. Huston & Co., \$23,509.58; Jonte, Barton & Crane, \$24,835.82; Sheldon S. Eaton, Covington, Ky., \$28,776.75; F. Keating, \$30,240.74; A. J. Jolly, Sons & Co., \$34,220.97; C. J. McDonald & Co., \$37,115.18; J. M. Stum, \$40,203.03. Contract awarded to John F. King. *Eight-Mile Bar*: Ware & Pyle, Cincinnati, O., \$22,609.55; bid informal. J. J. Shipman, Louisville, W. Va., \$24,588.74; J. C. Graham, \$26,938.10; W. H. Wheeler, Sciotoville, O., \$27,582.45; John B. Holbrook, \$29,459.74; Jonte, Barton & Crane, \$30,612.61; P. H. Kelley, Portsmouth, O., \$30,885.94; H. L. Hopkins & Co., St. Louis, Mo., \$32,311.84; I. V. Hoag, Jr., \$33,400.55; Simon Carmody and R. L. Mapel, \$33,587.27; R. G. Huston & Co., \$34,958.28; P. Kendrick & Co., Cincinnati, O., \$37,292.36; L'Hommedieu & Bloom, Cincinnati, \$40,264.67; Sheldon S. Eaton, \$41,482.22; M. D. Burke & Co., Cincinnati, \$46,307.64; C. J. McDonald & Co., \$65,250.33; A. B. Cole, Portsmouth, O., \$86,216.01. Contract awarded to J. J. Shipman. *Four-Mile Bar*: Ware & Pyle, \$36,542.89, bid informal; J. J. Shipman, \$40,260.78; W. H. Wheeler, \$44,329.42; P. H. Kelley, \$47,926.99; John B. Holbrook, \$47,855.80; I. V. Hoag, Jr., \$49,752.64; Jonte, Barton & Crane, \$51,214.87; H. S. Hopkins & Co., \$53,870.01; Simon Carmody and R. L. Mapel, \$54,984.19; C. B. Willey, \$56,555.17; R. G. Huston & Co., \$58,646.02; P. Kendrick & Co., \$59,809.22; L'Hommedieu & Bloom, \$64,000.28; B. C. Howell, Fort Gay, Wayne County, W. Va., \$65,702.78; Sheldon S. Eaton, \$70,664.65; M. D. Burke & Co., \$71,562.62; A. J. Jolly, Sons & Co., \$94,526.85; C. J. McDonald & Co., \$92,409.13; A. B. Cole, \$125,028.55. Contract awarded to John J. Shipman.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
October 18...	24.75	18.78	21.61	29.11	26.91	18.41

E. G. LOVE, Ph.D., *Gas Examiner.*

AMONG the exhibits at the Philadelphia Electrical Exhibition is a system of power and light supply for factories. The lamps shown are incandescent, and a loom was driven by a motor actuated by electricity.

A VISITOR, of a curious turn of mind, met his death at the International Health Exhibition a short time ago, while trying how much shock he could get from one of the dynamos in the dynamo-shed.

ON application of the National Telephone Company, limited, to lay underground wires in Edinburgh, the Streets and Buildings Committee of the Town Council has granted permission to lay two experimental cables. It is proposed that the wires shall be inclosed in metal pipes, laid at the depth of two feet below the surface of the streets, branch lines to be laid at various points on the route, where inspection-boxes will be placed. To provide means of communication between the underground pipes and the roofs of adjoining buildings for establishing electrical connections with the offices of the company's subscribers, it is proposed to convey a cable or bundle of wires from the most conveniently situated box under the footpath to the wall of the building with which it is required to establish communication, and to carry the cable, inclosed in a pipe of small diameter, up the wall of the building to the roof. On the roof will be erected a standard of wood or iron, similar in every respect to those now used by the company in Edinburgh, to which the cable or bundle of wires will be conveyed and attached. From the standard ordinary naked wires of small weight and diameter will extend to the offices of the subscribers.

THE Thomson-Houston system of electric-lighting is employed in Montreal, Canada. There are now 180 arc-lamps in various parts of the city, put up by the Royal Electric Company.

THE Turkish-bath chamber of the Cork lunatic asylum became in some way filled with coal-gas a short time since, and when an attendant entered with a light to find the leak a violent explosion occurred, doing some damage to the building, and causing a panic among the inmates.

THE Admiralty authorities at Portsmouth, Eng., have been testing electric-lamps for mast and signal lights on vessels. Lately a 50-candle Edison lamp was tested along with a standard oil signal-light, but the difference in favor of the Edison was so great as to prevent relative comparison. A 16-candle electric-lamp was found to be about twice the power of the oil-light, and it was found that the light of the former could be seen from a distance through a slight haze, when the oil-lamp had disappeared.

THE American Gas-Light Association met in Washington October 15.

A CABLE conduit in Philadelphia, into which gas was escaping from a neighboring gas-main, caught fire from a coal dropped by a passing fire-engine, October 15. The fire burned fiercely for about an hour.

THE Atlanta, Geo., Board of Aldermen has contracted with the Georgia Electric-Light Company to place 20 electric-lamps in the streets at 40 cents per lamp per night.

THE International Electric Exhibition of the Franklin Institute at Philadelphia closed on October 11, after an extraordinarily successful exhibition. The exhibition was not commenced with the intention of profit, but so successful has it been, and so large has been the attendance, that the managers will realize, after all expenses and prizes have been paid, a sum of \$10,000. Not only was the exhibition a success financially, but it was a most interesting, instructive and profitable display, not only to the scientific visitors, but to all classes, and it was highly appreciated by those who visited it. Much regret was expressed that the exhibition was not continued a longer period of time. The largest attendance on one day was 17,047, and the average was 3,407, the smallest number being 2,830.

THE accounts of the Sheffield, Eng., Gas Company for the six months ending June 30, show a profit of £30,884. The revenue from residuals alone was £31,777, of which £11,648 was received for coke, £11,625 for tar, and £8,440 for sulphate of ammonia. The average cost per ton of the coal carbonized (66,228 tons) was 10s. 7½d. (£2.57), of which 9s. 7d. (£2.32) was received from residuals. The accounts of the London Commercial Gas Company for the same period show a profit of £41,900; 85,794 tons of coal were carbonized, with a yield of 10,486 cubic feet of gas per ton. The leakage and unaccounted-for gas was 7 per cent. The coal cost 12s. 8d. (\$3.06) per ton, of which 9s. 2½d. (£2.23) was recovered by the sale of residual products.

ACCORDING to the *Gas and Water Review* a three-months' trial of cooking by gas instead of coal at the St. George's Infirmary, Westminster, resulted in a saving of £20.

REFERRING to the South Foreland lighthouse experiments, and the reported superiority of gas and oil over the electric-light in foggy weather, the *Electrician* asks whether any specially-prepared carbons have been used to obtain effective fog penetration. "Let us assume that rays at a certain part of the spectrum pass more easily through fog—yellow rays for example. Have carbons treated with sodium been tried? Have incandescent-lamps been tried? And so on. Till such trials have been made we maintain that the whole series of tests are of little real value."

THE Plymouth, Eng., Gas Company has reduced the price of gas to 1s. 10d. (44 cents) per 1,000 cubic feet.

THE Gas Committee of the Manchester Corporation, with the view of extending the use of gas, recommends the establishment of a department for the letting out of gas-stoves. The annual charge is to be 10 per cent. of the cost of the stove, and manufacturers are to be invited to send in samples of stoves.

THE Flint, Mich., Gas-Light Company has reduced the price of gas to \$2 per thousand.

THE Canonsburg Iron Company, of Canonsburg, Pa., struck a gas-well on its property October 15, and the gas is now being used to illuminate the grounds.

THE following is a complete list of the directors as proposed for the consolidated incorporation of the seven gas companies of New York City: Charles Roome, Thomas K. Lees, Oscar Zollkoffler, John P. Kennedy, Charles G. Franchlyn, Thomas Rutter, James W. Smith, Arthur Leary, Harrison E. Gawtry, Percy R. Pyne, Samuel Sloan, Henry Day, and John P. Huggins.

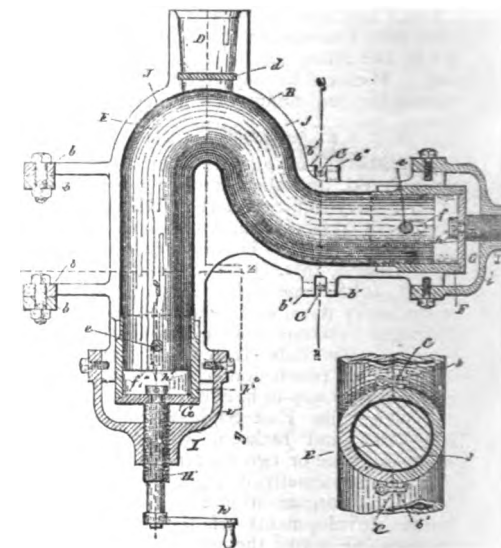
THE following figures concerning the illuminating-gases of this city are taken from the report of the Gas Examiner for the quarter ending September 30, 1884:

	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
Average Illuminating-power for the quarter.	24.74	18.31	22.31	28.60	27.98	18.27
Sulphur, grs. in 100 cubic feet	3.53	19.53	20.62	4.00	3.21	26.65
Ammonia, grs. in 100 cubic feet	0.55	15.24	6.68	0.83	0.25	17.19
Specific gravities	.632 to .642	.416 to .434	.530 to .554	.604 to .708	.650 to .644	.415 to .430

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

298,580. MACHINE FOR CASTING PLUMBERS' TRAPS. CHARLES E. HEISS, Chicago, Ill., assignor of one-half to James N. Raymond, same place. Filed February 28, 1883. (No model.) Issued May 13, 1884.

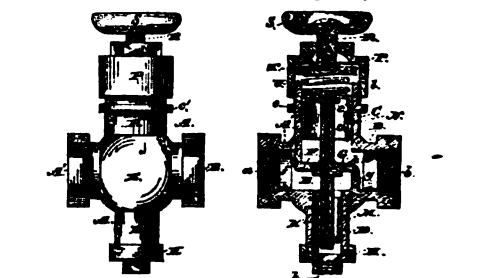


Claim.—1. A mold for casting plumbers' traps, having an enlarged inner diameter at its ends, a core extending into the enlarged cavity at each end, a sleeve at each end, arranged to move back and forth on the core, and having an inner portion of thickness suitable to fit around the core in the smallest part of the mold and an outer portion of the thickness to fit in the enlarged part of the mold, and support the core and mechanism whereby pressure may be applied to the sleeves, to force them inward, all in combination, substantially as and for the purpose described.

2. The mold B, in combination with the core E, the sleeves F, provided with slots f, and the pins c, substantially as and for the purposes set forth.

3. The mold B, in combination with the core E, the sleeves F, the follower G, the screw H, and a suitable fixed bearing for the screw, substantially as and for the purposes set forth.

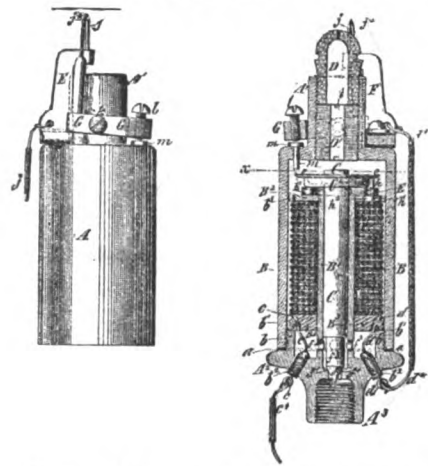
298,687. PRESSURE-REGULATOR. JOHN F. GOODING, New Haven, Conn. Filed September 20, 1883. (No model.) Issued May 13, 1884.



Claim.—In a pressure-regulator, the high and low pressure chambers, the dividing-partition provided with a connecting-opening, the hollow valve-rod passing through the opening and provided with a valve-head to close said opening on the high-pressure side of the dividing-partition, the piston or equivalent device attached to the rod acted upon by the pressure in the high-pressure chamber alone, and forced outward thereby

with a force equal to that exerted by said pressure upon the valve-head to force it and the rod inward to close the valve, the piston or equivalent device on the other end of the rod, adapted to be acted upon by the pressure in the low-pressure chamber to move the valve-rod so as to close the valve, and an adjustable spring device or its equivalent adapted to exert a yielding force upon the rod to move it so as to open the valve, substantially as and for the purpose set forth.

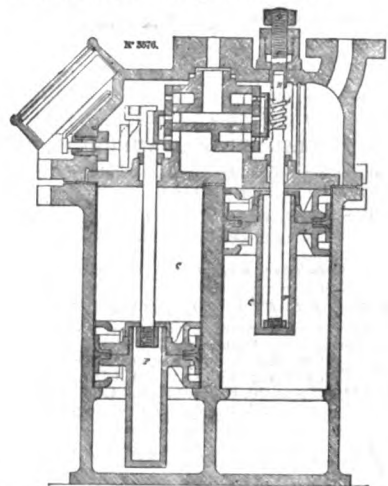
298,531. APPARATUS FOR LIGHTING GAS BY ELECTRICITY. LE ROY S. WHITE, Waterbury, Conn., assignor to the Electric Appliance Company, same place. Filed January 4, 1884. (No model.) Issued May 13, 1884.



Claim.—The combination, with the burner-case having a separable base, of an electro-magnet having a movable core, and the coil of which is attached to and has its terminals passing through said base, a circuit-breaking device outside of said case, and a piece interposed between said core and circuit-breaking device passing through said case from the interior to the exterior thereof, for producing the operation of said circuit-breaking device by the movement of said core, substantially as herein described.

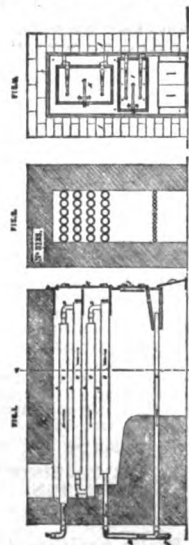
English Patents.

3,576. AN IMPROVEMENT IN WATER-METERS. Communicated from abroad by Alphonse Frager and (Madame) Veuve Michel, both of Paris, in the Republic of France.



JOHN IMRAY, of No. 28 Southampton Buildings, Chancery Lane, in the county of Middlesex. Prov. spec. July 20, 1883. Letters patented January 11, 1884. (Price 4d.)

3,133. IMPROVEMENTS IN APPARATUS TO BE USED IN THE CIRCULATION OF WATER OR LIQUID FOR HEATING PURPOSES, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:



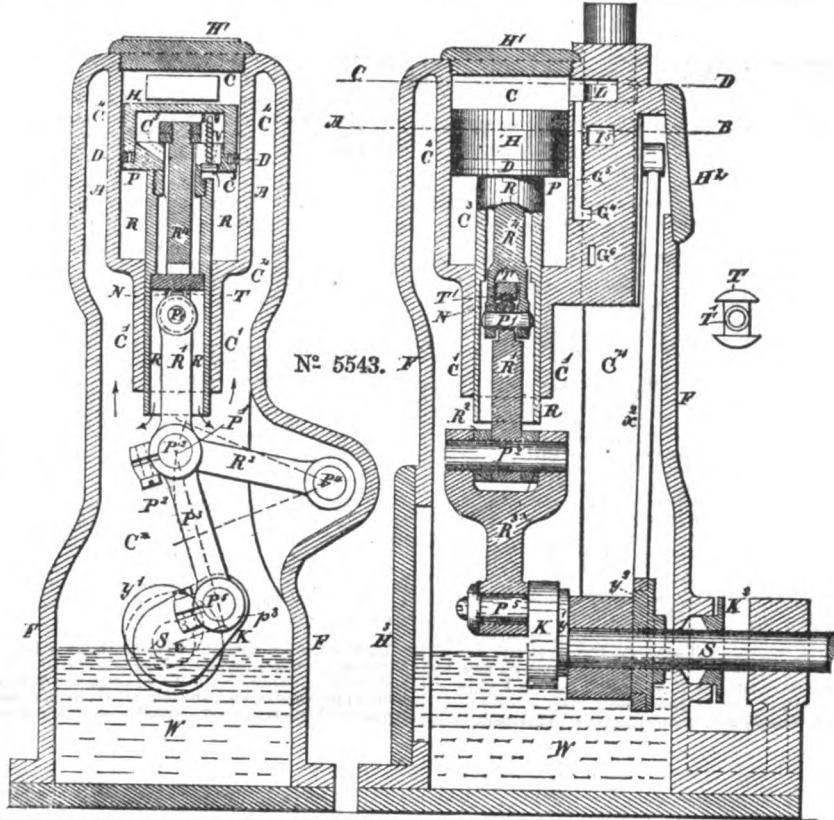
A boiler, or heater, consisting of a number of tubes, so arranged, and connected together, at their ends, that the water, or other liquid to be heated, shall circulate from one tube to the other until it has passed through the whole of the tubes; or the said tubes may be divided into sections in such a manner that the water in each section has an independent circulation.

JOHN JACKSON, of 13 Ironmarket, Newcastle-under-Lyme, in the county of Staffordshire, heating engineer. Com. spec. February 12, 1884. (Price 4d.)

5,543. IMPROVEMENTS IN THE CONSTRUCTION OF GAS-ENGINES AND IN CERTAIN METHODS OF OPERATING THE SAME.

The object of the invention is to produce a light, compact, durable, efficient, and powerful gas-engine, and to utilize the heat usually lost in a water-jacket, which is dispensed with.

LEWIS HALLOCK NASH, of Brooklyn, in the county of Kings and State of New York. Com. spec. November 27, 1883. (Price 8d.)



Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; b s dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

117-21 Bank st, 3 5-story br tens; cost, \$32,000; o, John Schreyer; a, Wm. F. Niebuhr; b, Niebuhr Bros.
67 Ludlow st, 6-story br ten; cost, \$20,000; o, Edward J. Burke; a, John C. Babcock.
300-302 Monroe st, 6-story br factory; cost, \$25,000; o, Henry A. Dingee; a, L. H. Broome.
23-25 W 57th st, 7-story br and st apart house; cost, \$140,000; o and a, Lamb & Rich.
105th st, s s, 245 W 4th av, 4-story br ten; cost, \$12,500; o, Dennis McGrath; a, Joseph M. Dunn.
Lexington av, n e cor 75th st, 5 5-story b s front tens; cost, corner \$17,000, others \$13,000; o, Bernard Wilson; a, A. B. Ogden & Son.
62d st, n s, 200 e Madison av, 2 3-story br stables; cost, ea \$16,000; o and b, Robert E. Lynd.
64th st, n s, 250 e 3d av, 3-story br stable and dwell; cost, \$10,000; lessee and b, John Barnett.
92d st, n s, 204.5 e 5th av, 4-story b s dwell; cost, \$32,000; o, Samuel and Isaac Untermyer; a, Hugo Kafka & Co.; b, Alfred Beinhauer.
Lexington av, e s, 60 s 125th st, br bldg; cost, \$15,000; o, Wm. A. Martin; a, Joseph M. Dunn.
99th st, s s, 100 W 11th av, e-story br and st flat; cost, \$25,000; o, Lorenzo Power; a, Wm. Schickel.
163d st, n s, s Union av and e s Tinton av, 17 2-story and bmt dwell; cost, ea \$1,800; o and b, John W. Decker; a, Adolph Pfeiffer.

BROOKLYN.

Quincy st, s s, 182 e Reid av, 4 2-story and bmt and 3-story rear b s dwell; cost, ea \$4,500; o, A. S. Walsh; a and b, A. Miller.
Lafayette av, s s, 113 e Sumner av, 5 2-story and bmt br dwell; cost, ea \$4,000; o, Michael Moran; b, Mr. Warren.
9th st, s s, 100 W 5th av, 3-story br st and hall; cost, \$13,000; o, Rescue Temperance Union and Christian Assoc.; a, W. H. Norris; b, J. Shannon.
Prospect pl, s s, 140 e Nostrand av, 2 2-story and attic dwells; cost, ea \$6,000; o, Alexander & Ellis; a, W. M. Coats.
Quincy st, n s, 22 W Marcy av, 4 2-story and bmt b s dwells; cost, ea \$5,500; and 1 3-story b s st and dwell; cost, \$6,000; o, David Bensley.
12 Broadway, s s, 20.9 e 1st st, 4-story free stone and br saloon and dwell; cost, \$25,000; o, Otto Huber; a, Lederle & Co.
1st st, n s, 96.10 e 7th av, 1 3-story and bmt and 2 2-story and bmt b s dwells; cost, \$9,000 and \$6,500 each; o, Martin & Lee.

Park pl, n s, 180.5 W 6th av, 4-story b s ten; cost, \$12,000; o and b, John Monas; a, J. J. Gilligan.
Madison st, s s, 25 W Throop av, 10 2 1/2-story and bmt b s dwell; cost, ea \$5,000; o, Paul C. Grening.
Madison st, s w cor Throop av, 3-story br flat; cost, \$10,000; o, Paul C. Grening.
15-19 Locust st, n s, 150 e Broadway, 3 3-story fr tens; cost, ea \$4,500; o, Valentine Popp; b, Wm. Maschke and John Rueger.
Pineapple st, n s, 150 e Hicks st, 5-story bmt and attic boarding-house; cost, \$18,000; o, Wm. Tumbridge; a, Augustus Hatfield.
Prospect av, s e cor 4th av, 5 3-story br tens; cost, ea \$5,000; o and b, M. A. Wood; a, C. B. Sheldon.
13th st, n s, 97.10 W 6th av, 4 2-story and bmt br dwells; cost, ea \$3,500; b, Edwin C. Squance.
8th st, n s, 222.10 W 7th av, 4 2-story and bmt b s dwell; cost, ea \$4,000; o and b, John Heesch; a, Mr. Bremerhoff.
Marion st, n s, 100 e Howard av, 4 2-story fr dwells; cost, ea \$2,500; o and a, Augustus Pettit; b, Ernst Sutterlin and Wm. Cunningham.

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Orange, Mass.; Chicago, Ill.,
St. Louis, Mo.

ALTERATIONS, NEW YORK.

Lexington av, n e cor 108th st, 1-story br extn; cost, \$5,000; o, Steers Bros.; a, Thomas J. Robinson.
129th st, foot of, and East River, rebuild for factory purposes; cost, \$5,000; o, Wm. H. Payne; a, J. F. Burrows.

37-41 W 22d st, altn of church into stores and lodgings; cost, day's work; o, James Russell White and others; a, W. Wheeler Smith; b, John J. Tucker and Alf C. Hoe & Co.

ALTERATIONS, BROOKLYN.

Meserole st, s s, 200 e Bushwick av, 5-story br extn; cost, \$20,000; o, Otto Huber; a, Charles Stoll.

DETROIT, MICH.—86 Larned st, br store; cost, \$25,000; o, Detroit News Co.; a, Donaldson & Meier; b, A. M. Gray.

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopoeial requirements.

We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

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PHILADELPHIA.

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BUILDING INTELLIGENCE.

(Continued from page 491.)

ALBEMARLE COUNTY, VA.—Country cottage; cost, \$6,000; o, Rev. J. J. Lafferty; a, M. J. Dimmock; b, Woodruff.

BYNAM, N. C.—Br Methodist Church; cost, \$6,000; a, M. J. Dimmock.

CHICAGO, ILL.—77-83 Pine st, br dwell; cost, \$17,000; o, F. H. Avers; a, Thomas & Rodger; b, C. Moses.

243-49 Centre av, br dwell; cost, \$20,000; o, Joseph A. Barbier; a, N. S. Patton.

3640-42 State st, br store and flats; cost, \$16,000; o, R. Hunter; b, McMillen Bros.

1020 Milwaukee av, br store and dwell; cost, \$10,000; o, John Kirkeby.

297-99 Clybourne av, br store and flats; cost, \$12,000; o, William Hensburg.

165 W Chicago av, br dwell and store; cost, \$10,000; o, Thomas Brown.

2124 Calumet av, br dwell; cost, \$18,000; o, Theo. A. Shaw & Co.; a, Cobb & Frost; b, Fox & Hinds.

Elm st, e of State, 5 3-story br dwells; cost, \$25,000; o, H. W. Leman; a, L. J. Halberg; b, A. Carlson.

2617-21 Wabash av, br dwell; cost, \$12,000; o, J. J. Gore; a, T. L. Chambers; b, Barney & Rodatz.

381-89 Irving av, 6 br dwells; cost, \$10,000; o, Freeman Campbell; a, Edbrook & Burnham; b, T. Campbell.

143-45 Dearborn av, br dwell; cost, \$10,000; o, J. W. Crawford; a, Furst & Rudolph; b, Robinson & Miner.

W. F. Furber, Thomas Rodger, John Clifford, John Otto, and John H. Matherson have plans for buildings valued at from \$5,000 to \$8,000.

HOLYOKE, MASS.—Manchester Grounds, 10 or 12 fr and br houses; cost, \$2,400 to \$5,000 each; o, L. B. White; a, Richmond & Seabury and Owners.

MILWAUKEE, WIS.—Architect C. F. Ringer has just begun making plans for a residence for S. Green, to cost \$10,000.

PHILADELPHIA, PA.—See cor of Herman and Hancock, 2 dwells; b, Oliver Fisher.

Nice st, bet Baker & Barr, 2 dwells; o, J. Meyer.

Front st, n of Cambria, 2 dwells; o, Theodore Meyers.

Chester ave, bet 48th and 49th sts, 2 3-story dwells; b, James D. Arthur.

Tioga st, e of 17th, infirmary bldg; b, W. R. Brown.

2d st, bet Norris and Diamond, 4-story factory; b, Jas. McCartney.

S w cor Hancock st and Lehigh, 4-story factory; o, Jas. McCartney.

2017-19 Girard av, 2 dwells; b, J. B. Rush.

Wayne st n of Berkeley, 2 dwells; b, Samuel Clauson.

Woodvale st n of Manayunk, 2 dwells; b, Charles Bartle.

Bowman st w of 35th st, 5 3-story dwells; o, Wm. Kindon.

Oxford st, e of 28th, 8 2-story dwells; b, Wm. Pole.

Tacony st, bet Orthodox and Margaretta, 2 dwells; b, Thos. B. Taylor.

S College av, bet 19th and 20th sts, 6 3-story dwells; b, John M. Sharp.

K st bet Erie av and Front st, 2 dwells; b, Thos. B. Taylor.

Mr. A. J. Fink, of Reading, Pa., will superintend the building of the addition to the Normal School, at Kutztown, Pa. The plans are by Mr. Durang, of Philadelphia.

ROCHESTER, N. Y.—The "Irondequoit" Hotel and Improvement Company was incorporated October 13, for building a hotel near the terminus of the Rochester and Lake Ontario Railroad. The capital stock is \$20,000.

ST. LOUIS, MO.—Shenandoah and Ohio sts, 6 2-story dwells; cost, \$12,000; o, Itiner Bros.; b, J. C. Brockmeyer.

Roche & Rolleman are architects for a \$6,000 and an \$8,000 building. E. Jansen has a \$7,000 building at Bull and Victor streets.

SYRACUSE, N. Y.—James and Pearl sts, iron roller-skating rink, 210x90; cost, \$15,000; o, George H. McClesney and the Rink Co.; a, A. Russell; b, Rink Co.

Warren st, br and st bldg; cost, \$40,000; o, Y. M. C. A. Association; a, J. H. Kirby and John Bates; O'Brien & Hoolihan, masons; William Sherlock, carpenter.

SPRINGFIELD, MASS.—56 Westminster st, fr house; cost, \$8,500; o, H. M. Washburn; a, Richmond & Seabury; b, E. W. Shattuck.

56 Westminster st, fr barn; cost, \$2,800; o, H. M. Washburn; a, Richmond & Seabury; b, E. W. Shattuck.

Bliss st, br boarding-house; cost, \$12,000; o, Woman's Christian Association; a, Richmond & Seabury; b, C. H. Scott.

10 Mattoon st, 3 br houses; cost, \$9,000; o, C. C. Smith Association; a, J. M. Currier; b, Senaria & Beuchemin.

On "The Hill," 8 or 10 fr houses; cost, \$2,500 to \$4,000 each; o, a and b, J. D. & W. H. McKnight.

WEST LONGMEADOW, MASS.—Fr house; cost, \$15,000; o, M. Wolcott; a, Jason Perkins; b, Walters.

Proposals.

OFFICE OF CHIEF QUARTERMASTER,
DEPARTMENT OF THE EAST,
GOVERNOR'S ISLAND, N. Y. H., October 15, 1884.

Sealed proposals, in triplicate, subject to the usual conditions, will be received at this office and the offices of the Quartermaster at the posts mentioned below, until 12 o'clock M., Eastern time, on the 15th day of November, 1884, at which time and places they will be opened in the presence of the bidders, for the construction of one set of barracks of brick, or frame, at each of the posts of Fort Adams, R. I., and Fort Hamilton, N. Y. H., in accordance with plans and specifications, which can be seen at this office, and at the offices of the Post Quartermaster at Fort Adams, R. I., and Fort Hamilton, N. Y. H.

One copy of this advertisement should be securely attached to each triplicate proposal, and be mentioned therein as comprising part of it.

Blank forms for proposals and information as to the manner of bidding, etc., can be obtained at this office.

Proposals must be accompanied by a guarantee with two sureties, in the sum of two hundred dollars.

A proposal not accompanied by such a guarantee will not be considered.

Envelopes containing proposals should be marked "Proposals for Construction of Barracks."

The Government reserves the right to reject any or all bids.

ALEX. J. PERRY,
Asst. Quartermaster-General, U. S. A.

STONE FOR DELAWARE BREAKWATER HARBOR.

UNITED STATES ENGINEER OFFICE,
1125 Girard Street,
PHILADELPHIA, PA., October 16, 1884.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock M., of Saturday, November 15, 1884, and opened immediately thereafter, for 23,000 tons of stone, more or less, to be used in the construction of the Delaware Breakwater Harbor.

For blank forms, specifications, etc., apply at this office.

W. H. HEUER,
Maj. of Engineers, U. S. A.

IMPROVING FLUSHING BAY, NEW YORK.

ENGINEER OFFICE, U. S. ARMY,
Room 31,
ARMY BUILDING, Cor. Houston and Greene Sts.,
NEW YORK, October 9, 1884.

Sealed proposals for Improving the Channel through Flushing Bay, New York, will be received at this office until twelve (12) o'clock noon, on Wednesday, November 12, 1884.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders, may be had on application at this office.

WALTER MCFARLAND,
Lieut.-Col. of Engrs.

IMPROVING NEWTOWN CREEK, N. Y.

ENGINEER OFFICE, U. S. ARMY,
Room 31,
ARMY BUILDING, Cor. Houston and Greene Sts.,
NEW YORK, October 10, 1884.

Sealed proposals for Improving the Channel of Newtown Creek, N. Y., will be received at this office until twelve (12) o'clock noon, on Wednesday, November 12, 1884.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders, may be had on application at this office.

WALTER MCFARLAND,
Lieut.-Col. of Engrs.

PROPOSALS FOR DREDGING.

U. S. ENGINEER OFFICE,
2107 Pennsylvania Ave.,
WASHINGTON, D. C., October 14, 1884.

Sealed proposal for Dredging in York River, Va., will be received at this office until 12 M. on November 20, 1884, and opened immediately thereafter.

Specifications, containing detailed information, and blank forms of proposals, can be obtained at this office. The right to reject any or all proposals is reserved.

S. T. ABERNETHY,
U. S. Civil Engineer.

PROPOSALS FOR IRON-WORK AT JACKSON, TENN.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 18, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 1st day of November, 1884, for furnishing and putting in place, complete, the Iron Columns and Girders required for the Court-House, Post-Office, etc., at Jackson, Tenn., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
Supervising Architect.

PROPOSALS FOR PAINTING, BRONZING, AND POLISHING AT CINCINNATI, O.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 18, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 8th day of November, 1884, for all the Painting, Bronzing, and Polishing required for the Custom-House and Post-Office building at Cincinnati, O., in accordance with specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
Supervising Architect.

PROPOSALS FOR STONE AND BRICK WORK AT TERRE HAUTE, IND.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 6, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 31st day of October, 1884, for supplying and setting all the stone-work, and furnishing and laying all the brick-work required for the basement and superstructure of the Post-Office, etc., building at Terre Haute, Ind., in accordance with drawings and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
Supervising Architect.

PROPOSALS FOR HARBOR IMPROVEMENT.

U. S. ENGINEER OFFICE,
BUFFALO, N. Y., October 15, 1884.

Separate sealed proposals, in triplicate, will be received at this office until 11 o'clock A. M. (75th meridian time) on the 15th day of November, 1884, for dredging the west channel and repairing the East Breakwater at Dunkirk Harbor, N. Y.

Specifications, blank forms, and instructions to bidders may be had on application at this office.

EDWARD MAGUIRE,
Capt. of Engineers, U. S. A.

IMPROVING HARBOR AT NORFOLK, VA.

U. S. ENGINEER OFFICE,
NORFOLK, VA., September 24, 1884.

Sealed proposals, in triplicate, will be received at this office until noon of October 24, 1884, and opened immediately thereafter, in the presence of bidders, for dredging in Norfolk Harbor, Virginia. The amount available for this work is \$23,000.

Specifications, instructions to bidders, and blanks for proposals can be had on application to this office.

F. A. HINMAN,
Captain of Engineers, U. S. A.

IMPROVING APPOMATTOX RIVER, VA.

U. S. ENGINEER OFFICE,
NORFOLK, VA., September 23, 1884.

Sealed proposals, in triplicate, will be received at this office until noon of October 23, 1884, and opened immediately thereafter, in the presence of bidders, for dredging one hundred and thirty-five thousand (135,000) cubic yards, more or less, and for furnishing small quantities of piles, lumber, gravel, brush, binding-poles, bolts, and spikes for the improvement of Appomattox River, Virginia.

Specifications, instructions to bidders, and blanks for proposals can be had on application to this office.

F. A. HINMAN,
Captain of Engineers, U. S. A.

Brick buildings at Camp Rice, Tex., 17 in number.

Until November 11. Address Major J. G. C. LEE, Chief Quartermaster, San Antonio, Tex.

Dredging in Corsica Creek, Ind. Until October 30. Address W. F. SMITH, U. S. Agent, Engineer Office, Wilmington, Del.

Alterations and repairs on post-office building in Jersey City. Until October 27. Address M. J. DADY, Superintendent of Repairs, U. S. Post-Office, New York City.

Improving channel in Flushing Bay, L. I. Until November 12. Address WALTER MCFARLAND, Lieut.-Col. Engr's, Engineer Office, Hudson & Greene Sts., New York.

Improving channel of Newtown Creek, L. I. Until November 12. Address WALTER MCFARLAND, Lieut.-Col. Engr's, Engineer Office, New York.

Construction of barracks at Fort Adams, R. I., and Fort Hamilton, N. Y., of brick or frame. Until November 15. Address ALEX. J. PERRY, Asst. Quartermaster-General, U. S. A., Governor's Island, New York Harbor.

Dredging in following harbors: In Wareham Harbor, Mass., appropriation \$10,000. In Harbor of Refuge, Wood's Holl, Mass., about 7,000 cubic yards. Until October 31. Address GEORGE H. ELLIOTT, Lieut.-Col. Engr's, Engineer Office, Newport, R. I.

City Hall at Richmond, Va. Until December 1. Address W. E. AITSHAW, City Engineer.

23,000 tons of stone for Delaware Breakwater Harbor; Until November 15. Address Maj. W. H. HEUER, U. S. A., Engineer Office, 1125 Girard Street, Philadelphia.

Opening, grading, etc., Druid Hill Avenue, Baltimore. Until November 6. Address GEORGE H. CARMAN, No. 11 Morse Building, 50 West Fayette Street, Baltimore, Md.

Light-house supplies, including blocks, brushes, chimneys, cordage, dry-goods, engineers' stores, flags, and bunting, hardware and tools, lamps and lanterns, lumber, paints, oils, etc., ship chandlery, soap, tinware, wicks, window-glass, wood and willow-ware, and miscellaneous articles. Until November 5. Address Capt. GEORGE BROWN, U. S. A., Inspector, Tompkinsville, N. Y.

Repairs to the steam-heating work of the east wing, Insane Asylum, Ward's Island, N. Y. Until October 31. Address COMMISSIONERS OF THE DEPARTMENT OF CHARITIES AND CORRECTION, New York City.

Erecting an electric-light plant (incandescent) on Ward's Island, N. Y. Address the COMMISSIONERS OF THE DEPARTMENT OF CHARITIES AND CORRECTION, New York City.

Proposals for constructing Sections A and B of the New Croton Aqueduct in the Twenty-fourth Ward of the city of New York, will be received until Wednesday, October 23, 1884.

The portion of the New Aqueduct for which bids are hereby invited is in tunnel, and is divided into two sections—viz.:

SECTION A.—Extending from a point near the High Bridge, northward a distance of about 11,850 feet, and having three working shafts.

SECTION B.—Extending from the end of Section A northward a distance of about 12,300 feet, and having two working shafts.

Bidders can bid for either one, or for both, of the above sections, but each section must be bid for, and will be awarded separately. Any bidder for both sections who will not accept an award for one section only must so state in his bid.

Each bid must be inclosed in a sealed envelope, indorsed with the name of the person or persons making the same, and the section for which it is made.

The amount of security required in the contract for Section A is \$125,000, and for Section B \$135,000, with not less than two satisfactory sureties, who must be householders or resident freeholders of the State of New York.

Full information, blank forms, etc., may be obtained by addressing:

J. W. McCULLOH,
Sec'y Board Aqueduct Commissioners,
New York City.

Proposals will be received until October 25, 1884, for iron superstructure and supports of the Kingsbury, Pa., Viaduct, between Davies and Humboldt Streets. For further information, address:

C. G. FORCE,
City Civil Engineer,
Cleveland, O.

Furnishing rip-rap granite for breakwater at Block Island, R. I. Until October 28. Address GEORGE H. ELLIOTT, Lieut.-Col. Engrs., Engineer Office, U. S. A., Newport, R. I.

Materials and workmanship for new court-house at Galesburg, Ill., after plans by E. E. Myers, architect. Until October 24. Address W. SELDEN GALE, Chairman of Building Committee, County Clerk's Office, Galesburg.

Materials and labor for court-house at Muncie, Ind. Until November 6. Address WILLIAM DRAGOO, Auditor, Muncie, Ind.

Furnishing steam-boiler for Cape Fear River improvement. Until October 24. Address WILLIAM P. CRAIGHILL, Lieut.-Col. Engrs. U. S. A., Engineer Office, Baltimore, Md.

Eight-inch tubes for converted rifles. Until November 7. Address S. V. BENET, Brig. Gen. Chief of Ordnance, U. S. Ordnance Office, Washington, D. C.

Proposals received for rock excavation and dredging in Taunton River, Mass., until October 24, 1884, at the Engineer's Office, U. S. A., at Newport, R. I.

For further information, address:

GEORGE H. ELLIOTT,
Lieut.-Col. of Engineers U. S. A.

Supplies for ad and 3d Districts, Mississippi River—wire, iron, nails, spikes, hardware, castings, oils, paints, lumber, rope. Until October 25. Address CLINTON B. SEARS, Capt. Engrs., U. S. A., Engineer office, Memphis, Tenn.

Miscellaneous supplies for the San Antonio, Tex., Arsenal. Until October 29. Address ISAAC ARNOLD, Jr., Maj. of Ordnance, Comdg., San Antonio, Tex.

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THE HYGIENIC AND SANITARY ENGINEERING CO. (LIMITED), 23 and 24 Charing Cross, London, have purchased the Patent Rights and Business of MR. DANIEL T. BOSTEL, of Brighton and London, including BOSTEL'S "EXCELSIOR" WATER CLOSET.

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LONDON, October, 1883.

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EXHIBIT: International Health Exhibition, Class 23—508.

THE SANITARY ENGINEER.

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Continental subscriptions are also received by F. A. BROCKHAUS, Esq., Querstrasse 29, Leipzig, Germany, and ASHER & Co., Unter den Linden, Berlin.

Subscriptions to the Continent of Europe and Australia, \$5; China, Japan, Sandwich Islands, Mexico and Cuba, \$5; South America, \$5. The date when the subscription expires is on the Address-Label of each paper, the change of which to a subsequent date becomes a receipt for remittance. No other receipt is sent unless requested.

Subscribers will please notify us promptly of any failure to receive the paper, and also of any change in their address.

Remittances are at the risk of the sender, unless made by registered letter or by check or money order payable to THE SANITARY ENGINEER. When a change of address is desired, both the old and new addresses should be given.

NOTICE.—Correspondents will prevent needless delays and annoyance if they will address all communications, except those of a strictly private nature, to THE SANITARY ENGINEER. Checks should also be drawn to the same order.

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RAGS AS A MEANS OF CONVEYING INFECTION.

UNDER the orders of the United States Treasury Department, foreign rags, and especially those imported from the south of Europe, cannot be landed in the United States until November next. In Great Britain rags from France and Italy were in like manner excluded during the summer. Whereupon the importers of rags and the manufacturers of paper remonstrate, claiming that there is no evidence as to the transmission of disease by rags, except, possibly, small-pox; that an important industry is being injured; that it will cause such a rise in the price of paper as will make it impossible to publish cheap newspapers, and that rags should either be admitted freely, or at all events be allowed to come in under a system of inspection and disinfection.

The recent action of the Government is, as we have pointed out in a previous editorial, merely temporary. When we come to consider what should be our permanent policy in dealing with rags, the following points must be borne in mind: In the first place, it is true that there is no satisfactory evidence that cholera has been caused by baled imported rags. It is the general belief of physicians and scientific men that the cause of cholera might be so transported, but that while this is possible the risk of such conveyance is small. If the cause of cholera can adhere to rags it is very uncertain how long it can retain its powers. We have no assurance that the mere keeping of a bale of rags unopened for three or four months will insure the destruction of any cholera germs which may be contained in it. The means by which rags may be so disinfected as to remove all danger of their acting as a carrier of disease are well known and are simple. But if security is to be looked for in this direction, it is obviously necessary that such disinfection should be carried on under Government supervision.

If an attempt is made to exclude only rags coming from certain ports, as for instance from the Mediterranean, the effect would simply be that the rags would be taken to some other port against which our embargo did not exist, and from thence they would be reshipped directly to us, the effect being a delay of a week or so in the time of their passage, and some increase of cost, but very little gain in security from infection.

It does not seem to us, therefore, that any system which merely forbids the importation of rags for a few months, or which forbids the importation only from certain ports, is to be recommended.

The question then arises, is it worth while to insist on the disinfection, under Government inspection, of all foreign rags brought to this country? There is plenty of room for honest difference of opinion as to what should be the answer to this question. We do not believe that rags can be satisfactorily disinfected while in the bales as imported, and we do not believe that while in the bales they are specially dangerous. Whatever risk there is occurs in the opening of the bales and in the preliminary sorting.

The great majority of the operatives in a paper-mill run no risk, for they do not come in contact with the rags until they have been thoroughly moistened with chemicals which will destroy infection. So far as small-pox is concerned, the protection of the small number of operatives

who handle the rags before they are thus disinfected, is so easily assured by vaccination that the trade should not be interfered with on this account.

So far as cholera is concerned, we believe the risk from infected rags to be also insufficient to warrant the requirement that all rags shall be disinfected before the manufacturer is allowed to receive them. But while thus believing, we recognize the fact that not only the public at large, but also a large number of physicians, and of those who should be most competent to judge, think otherwise, and we should hesitate to take the responsibility of permitting the free and unrestricted admission of rags to our ports until we had carefully investigated the question as to the possibility of enforcing their disinfection as soon as the bales were opened, and as to the cost of securing this. This investigation should be made by some competent and impartial persons, and we still think, as we suggested in a former editorial, that the National Academy of Sciences is the proper body to which the question should be referred.

DISPOSAL OF SEWAGE IN STREAMS.

AN easy method of getting rid of troublesome sanitary questions is to fall back on Nature, and refer to the continued existence of the world as evidence that recuperative forces exist in the universe which will remedy evils left to themselves. It is sometimes stated, even by wise and experienced men, that we may trust to Nature to take care of the refuse matters of civilized life, if we only get them out of our immediate neighborhood and put them into water of sufficient volume to dilute them thoroughly, for then "Nature's laboratory" will set to work and neutralize the offensive elements. This off-hand shifting of responsibility from our heads to assumed natural laws is neither scientific nor practical. The waters of the State of New Jersey, for instance, may be able to receive safely all the excreta and wastes of the 1,200,000 inhabitants of the State, and decompose them, without endangering or incommoding a single person. But if the average is not maintained, and as in the case of the counties of Essex and Hudson, thirty per cent. of the population is concentrated on three per cent. of the area of the State, the work imposed on Nature is excessive and out of proportion to the normal operation of its purifying forces.

The volume of water which must receive the wastes of the population is vast indeed, but in this case it is not freely flowing. It is in a measure impounded by the operation of the tides and its flow retarded, so that impurities cast into it are not dispersed, and their decomposition and dissipation must be effected by chemical change, which is more tardy than the mechanical action of a rapid current.

The laboratory is overworked, and the results are offensive and injurious to the population, in like manner with (though as yet not to the same degree) the operations of bone boilers and petroleum refiners. It is plain, upon a little reflection, that the operations of Nature must be aided by man in many places. The foul wastes must not simply be cast upon the waters in their original condition, but must in most instances first be purified, to some extent at least, before they are handed over to Nature to finish the work.

This must be done with the wastes of every large community which is not on the banks of a large and swiftly-flowing river. New York, Brooklyn, Philadelphia, Jersey City, Newark, Chicago, Cleveland, and Detroit, and many other cities, will be compelled before many years to do what Boston has done, and hundreds of European cities are doing, and that is, either remove their sewage to a great distance, or partially purify it before casting it into adjacent water-courses.

THE recent Congress of Industrial Hygiene at Rouen had for its aim the study and discussion of all the conditions which affect the material well-being of the working population of large cities. Various papers were read on the ventilation of work-rooms, on which a great deal of stress was laid, especially on the removal of dust of various sorts. Doctor Deshayes gave a sorry picture of the condition of the spinning population of Rouen. The workman rises at five o'clock and goes to the mill after having taken for his sole breakfast one or more glasses of wretched brandy. Until seven, eight, or even nine o'clock in the evening he remains shut up in the confined and unwholesome air of the work-room. He has only about an hour or an hour and a half for his meals. Thinly clad, he passes directly from the air of the overheated room into the cold and damp street, where he eats a little bread and cheese, standing on the sidewalk or in the factory yard. The water-closets are filthy, badly ventilated, and imperfectly lighted; work-people of both sexes use them promiscuously. Dr. Deshayes ascribes the prevalence of tuberculous disease to the insanitary conditions of the life of the spinning population—a conclusion which was, however, disputed by Professor Leudet. The insanitary conditions were not denied.

THE city of Springfield, Massachusetts, has a system of water-supply by gravity which has cost \$1,276,000. The Water Commissioners ask for \$450,000 more to lay an additional pipe from Ludlow Pond to the city. This proposition is meeting with opposition from some citizens, who think that a careful investigation should be made as to the amount of water wasted or unnecessarily used, and the possibility of restricting such waste before incurring an expenditure equivalent to over \$50 per head for every man, woman, and child in the city. The views of these gentlemen on this subject are unquestionably sound, and the City Council ought to require from the Water Commissioners the most conclusive evidence that they have exhausted all means in their power of judiciously economizing the existing supply before they authorize the expenditure of half a million dollars for water, which careless water-takers will only receive to throw away unused.

THE Citizens' Association of Chicago has issued a circular offering a prize of \$500 for the "best practical essay on the Main-Drainage, Sewerage, and Water-Supply Systems of Chicago and its Vicinity." The names of the three gentlemen who are to act as judges have not yet been announced. Until they are made known no persons competent to compete for this prize will be likely to take much interest in the matter. Even then, the prize offered is so ridiculously small that no engineer of experience or standing in the profession will be apt to enter into competition for a sum less than he would charge for preparing a plan of sewerage for a town of 10,000 inhabitants. To secure the attention of competent, experienced men of broad views the compensation offered should be not less than \$2,500 and the assurance of an engagement to carry out the plan accepted. Even then it is questionable whether the best engineering talent could be induced to undertake the labor of a study of this vast subject for a purely contingent remuneration.

DR. HOSMER H. JOHNSON, of Chicago, has resigned as member of the National Board of Health, and the President has appointed in his place Mr. Dunwoodie, the present Chief Clerk of the Board.

OUR BRITISH CORRESPONDENCE.

Water-Supply of South London—Inebriates—Sanitary Congress at Dublin—State of the Liffey—High Church and Water-Closet Decoration.

LONDON, October 11, 1884.

A RATHER curious point has arisen with regard to the water-supply of a part of South London. It appears that the majority of the houses in that district have hitherto received their water from private artesian-wells. The Southwark & Vauxhall Company has recently sunk a deep well in the locality, which has had the effect of withdrawing all the water from the private wells which are of less depth than the company's well. By the English law there is no remedy against the company for this act, it being what is technically called a *damnum sine injuria*—i. e., an injury not actionable at law. But the company has not only withdrawn the people's water, but has added to the offense by offering to sell it to them again at the usual rate. The inhabitants are naturally indignant at the company's action, and though they cannot prevent it taking the water, they intend to contest the point of the legality of the company making profit by selling the water which it had taken from others. A committee has accordingly been appointed to take steps to ascertain the proprietary rights of the inhabitants. The result is looked forward to with some interest, as the decision will, to a certain extent, constitute a precedent.

Mr. Oakey Hall read a paper on the 7th inst., before the "Society for the Study and Cure of Inebriety" here, on "American Legislation Respecting Inebriates." The chief object of his paper was to show that American legislation recognized inebriety as a disease, and that inebriates ought to be classed with persons suffering from yellow fever or other contagious disease, which rendered their presence in society a source of public danger. He pointed out that fifty years ago the statutes of the State of New York had provided for the custody and care of habitual drunkards, and had thus recognized inebriety as a disease.

Perhaps one of the most noticeable features in the Sanitary Congress meetings lately held in Dublin was the disregard so frequently shown to the customary courtesies extended to lecturers or readers of papers. Ladies and gentlemen came in and went out, shifted about chairs and knocked down umbrellas with the most perfect *sans froid* and freedom, while a buzz of conversation was almost persistent. It might be suggested to the council that during the next congress (which is announced to be held at Leicester next year) they should hang notices in the meeting-rooms to the effect that "members of the audience must not speak above a whisper during the reading of papers."

If any one is anxious to see and smell a state of things that should not exist he should go to Dublin and see the Liffey. This river is simply an open sewer, neither more nor less, passing right through the centre of the town. At every few yards in the wall on each side of the river (or rather canal) are the outlets of small tributary sewers, discharging into it at states of the tide. These outlets, at low water, are considerably above the level of the water, and you can see and smell the sewage as it falls. It is perhaps almost superfluous to add that the "river" can be smelt at some distance. I am credibly informed that this is by no means the only thing in the way of bad sewerage of which the inhabitants have to complain. Sewers are frequently discovered that have been laid without joints. The Corporation Engineer states that "they are always jointed with clay, but my informants, who are in a position to know, declare that the pipes are very frequently simply slipped one into the other and then covered in. Again, this is not all. What can be said in defense of the statement that a long stretch of sewer, one end connected, the other "dead," runs under one of the principal streets (Westmoreland Street) toward the principal bridge (Carlyle Bridge)? For some reason the construction was interfered with before completion, and it was covered in as stated above. Even supposing the pipes are well jointed, this hot-bed for decomposition would be bad enough, but if bad (or no) joints have been made, the ground surrounding must be in a bad state.

A well-known manufacturer in England recently received a memorandum from one of his customers, a firm of merchants, requesting him to be good enough to exchange two pieces of crockery returned therewith for others of a differ-

ent ornamental design. They were for a vicarage, and the new vicar objected to a water-closet being adorned with passion-flowers. SAFETY-VALVE.

MEASURING DISTANT TEMPERATURE BY TELEPHONE.

DR. LENZ has recently described a method for employing the telephone in determining temperatures at a distance. If two stations, A and B, are connected by means of two wires, one of iron and the other of silver, soldered together at the extremities, a thermo-electric current will pass through the wires as long as the temperature at A differs from that at B. If an interrupter and a telephone are introduced into the circuit, the telephone will "talk" until the temperature has been equalized, and there is no longer any current through the wires. If the observer be stationed at A he can determine the temperature at the distant point, B, by raising or lowering the temperature at A until the current ceases. In a series of experiments in which A and B were one meter distant from each other, Dr. Lenz found the error of determination to be only from one to seventeen-hundredths of a degree Centigrade, and believes that with the use of wires of bismuth and antimony A and B might be twenty-five kilometers apart. —*Revue Industrielle*.

IMPORTATION OF RAGS.

THE Customs Division of the Treasury Department has issued the following circular in reference to the importation of rags into the United States:

To Customs Officers:

Department circular No. 145, dated August 30, 1884, is modified so as to limit it to infected ports only, and all Mediterranean ports are deemed infected ports within the meaning of this order; provided, however, that no old rags shall be landed at any port of the United States except on a certificate of the United States Consular Officer at the point of departure that such rags were not gathered, or baled at, or shipped from any infected place, or any region contiguous thereto. W. Q. GRESHAM,

Secretary.

THE BOSTON BOARD OF HEALTH NOT TO BE USED TO PROMOTE THE SALE OF ANY PARTICULAR TRAP.

BOARD OF HEALTH, 32 PEMBERTON SQUARE, }
BOSTON, October 22, 1884. }

To the Editor of THE SANITARY ENGINEER:

IT has lately come to our notice that certain parties interested in some new sanitary appliances, including a new form of trap, have chosen to make use of the name of the Boston Board of Health as having indorsed their claims as to the peculiar merit of their inventions.

In justice to ourselves, as well as to the proprietors of other appliances, we will esteem it a favor if you will announce through the columns of THE SANITARY ENGINEER that such use of the name of this board is entirely unauthorized and unwarranted. The Boston Board of Health has not authorized any discrimination in favor of or against any particular form of trap or other invention, and the parties who are using our name as indorsers of their appliances appear to be guilty of false pretences.

Very respectfully, SAMUEL H. DURGIN,
Chairman.

WE have been taught for a number of years that we ought to eat bread made from unbolted flour, containing the whole of the grain. After we have habituated ourselves to eating such bread—not without suspicion that the color and appearance are sometimes due to something besides grain—we now find that the tide is turned, and the most wholesome flour is that from which the outer envelope of the grain is removed. Such, at any rate, was the opinion of Mr. Clifford Richardson, of the Agricultural Department, if we understood his remarks at the recent meeting of the American Association. Such is the view of M. Aimé Girard, in a recent number of the *Comptes Rendus*, and such is the opinion of other modern authorities.

THE Health Committee of Birmingham, Eng., recommends the erection of additional plant for disposing of the town refuse. The system in use may be styled a reversed separate-system of sewerage, for "all excrementitious matters, solid and liquid," are excluded from the sewers. These are collected from tubs, and evaporated to a dry powder by "the heat evolved from the combustion of the dry refuse from the ash-tubs." Farmer's drying-machines are used. Each machine produces on an average four tons of dried poudrette per week.

DANGEROUS BLUNDERS IN PLUMBING.

So many examples of curiously outrageous plumbing have come, in one way and another, to our notice that we have decided to publish some extracts from our collection in two or three articles. The drawings show so plainly at a glance what is wrong, to one who knows something of plumbing, that comment would be unnecessary, except that many of our readers, not being plumbers, nor well posted in such matters, may want us to point out wherein the work is so bad.

The first figure shows what clumsiness did in a house on Second Avenue, in this city, where a member of the staff of this paper boarded for some time, and happened to

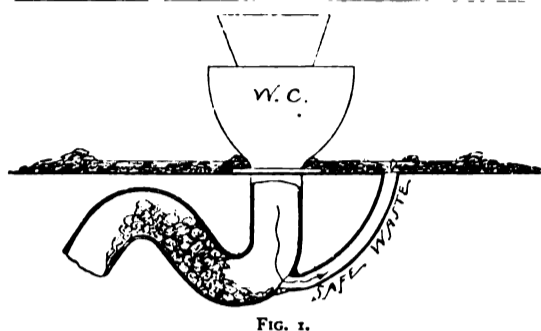


FIG. 1.

meet the plumber making repairs. An old pan-closet, in a dark, unventilated central room, such as is common in many New York houses, had been filling the hall with a terrible odor for some time. Finally the owner of the house sent a plumber to fix it. The cause of the smells then became plain enough. Under the closet was a safe, and from this safe led a waste-pipe into the heel of the water-closet trap. The level of the safe was but little above the top of the trap, which had been partially clogged up by things thrown into the closet. The result was that every time the handle of the closet was pulled, the discharge from the pan caused a jet of filth to shoot up from the trap through the safe-waste into the safe. This was practically illustrated by the plumber who was sent to make repairs, and it had gone on until the safe had filled, overflowed on to the floor, and leaked down between the floor-beams. The whole space inside the closet-casing was a wet mass of nastiness, which had filled the upper floors of the house with foul smells for several weeks. Yet this so-called plumber insisted that the work in this house was a good job!

Figure 2 shows an arrangement even worse than the former. In this case the waste-pipe from the safe under

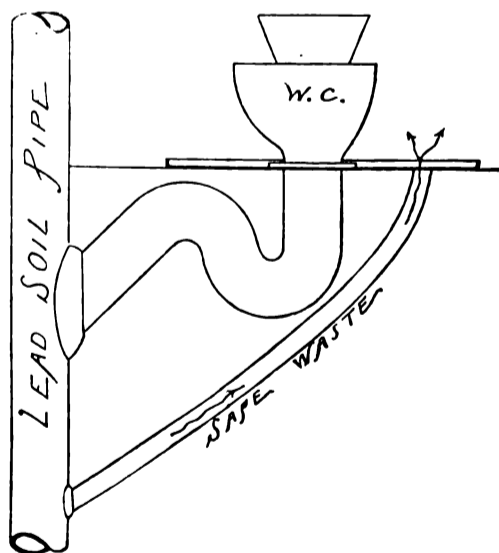


FIG. 2.

the water-closet was taken directly into the soil-pipe, completely neutralizing the trap under the water-closet, and giving an opening for the foul air in the soil-pipe to enter the space within the water-closet casing, not shown in our drawing, whence it would readily enter the water-closet room, and spread through the house.

Figure 3 was reported to us by a well-known master plumber of this city. It is drawn to represent the condition which he found when called in to discover and remove the cause of foul smells which permeated a residence in the fashionable quarter.

The house being built on a damp foundation, a drain to remove the ground-water had been put in, as shown by the

dotted lines. This drain connected with the street-sewer directly without a trap, which, indeed, without some means of preserving its seal against evaporation, would have been of little use. The main line of drain, not removing all the ground-water, which collected in the ash-pit of the furnace, a branch drain was taken, without a trap, from it to the ash-pit. Mark the result. When the furnace was fired up in the autumn, a part of the air-supply was sucked, as by an air-pump, directly from the public sewer through the branch-drain, and these foul gases were distributed all over

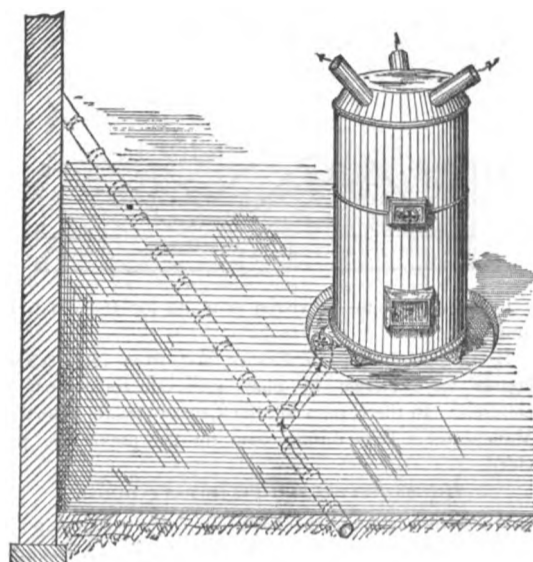


FIG. 3.

the house through the hot-air pipes. Unfortunately, this, though perhaps the worst, is not an isolated case of a furnace taking its air-supply from a drain. We shall publish another soon, and we believe instances of the same thing have come to the knowledge of the Board of Health.

Figure 4 is ingeniously bad. It was discovered by a

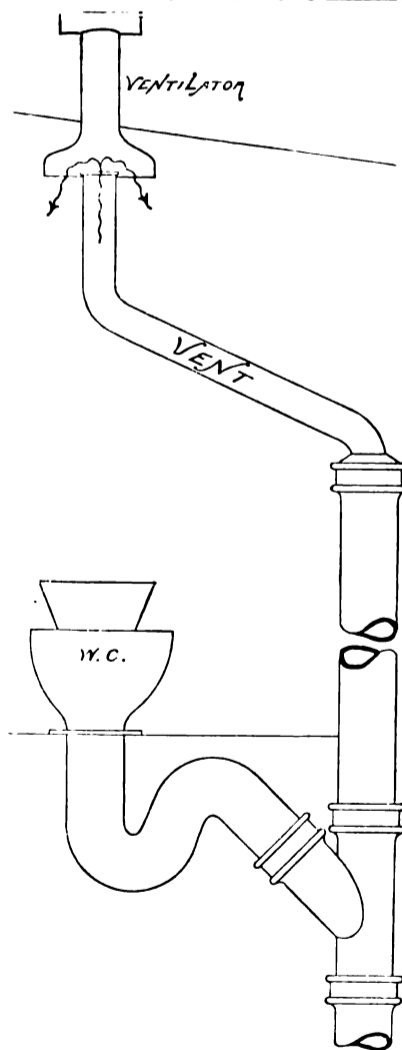


FIG. 4.

journeyman plumber in the employ of one of the prominent plumbers of this city. By some process of reasoning the workman who did it had come to the conclusion that he could make one and the same ventilating-hood serve for his soil-pipe and for his water-closet room. He arranged it as shown in the drawing. From the top of the

soil-pipe he took a vent-pipe to the under part of a ventilating-hood. This hood was open at the bottom to ventilate the room, and consequently there was produced a very good means of bringing the soil-pipe air first into the hood and then into the room, as the arrows indicate.

PEST-HOLES IN NEW YORK.

No. V.

(Continued from page 457.)

THE double tenement-house No. 36 Mulberry Street may well be said to come under our title. It is of brick, 37 feet front by 40 feet deep, and five stories and a basement in height. The basement of this building, consisting of four rooms with four small bedrooms attached, is used as what is known as a "stale-beer dive." Our visit to these premises was about 11 A. M., and at that time we counted over forty persons, male and female, in all stages of intoxication, misery, and filth, some carousing, others sleeping, and all presenting the most abject state of degradation, coupled with visible manifestations of moral leprosy and crime.

In the first of these rooms were about a dozen wretches, but not one stick of civilized furniture. Around the walls are boards to sit or lie on, but nothing else is to be seen, unless a soap-box or a bundle of rags. In the bedroom is the proprietress, and it is here the stale beer is sold for a cent a glass. This person pays \$14 per month for these quarters, we are told, and makes that sum and a living out of this traffic—supplying beggars and tramps. The walls are covered with human excretions. The floors are covered so thick with filth that one hardly knows it is boards he walks on, were it not for the hollowness of the sound. Vermin creep over everything, and nastiness reigns supreme. Four such holes are kept in the basement, and one or two on the first floor.

In the yard is an abominable privy-vault, the leakage from which runs into the cellar under these quarters. This whole yard is in a state so filthy with human excrement and urine that one has to pick his steps.

Above this pest-hole the remainder of the house teems with human beings, mostly Italian. Count its occupants we could not, as it is almost worth one's life, certainly his valuables, to make the second excursion up those stairs. Approximately there is one lodger to each 150 cubic feet of space, and a close examination at night may reduce it to half that amount. In addition to all this is a litter of household rubbish and bedding, extreme filthiness, and darkness.

THE INTERNATIONAL HEALTH EXHIBITION.

No. XXIII.

(Continued from page 485.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

CONSTRUCTION OF SCHOOL-HOUSES.

ONE of the most prominent questions concerning primary education now being discussed on both sides of the Atlantic is that of overwork. There are those who claim that there is no proof that any danger to health need be feared from the methods of the public schools, and, on the other hand, there are those who see in the system of modern education the causes of a future race deterioration.

In considering this question, the sanitary construction of the school-house, the suitable proportion of physical exercise and care are not sufficiently emphasized. Children may be taken from out-of-door life and activity, even though it be the life of the streets, and huddled together into the close, vitiated air of a school-room, and when once in they may be kept as still as it is possible to keep such restlessness. An unnatural strain is caused by these conditions, and the tasks given to be learned at home leave only the time spent in going to and fro from school as exercise time. The poor or unsuitable food which so many children have to eat might digest without difficulty under the stimulus of fresh air and exercise, but it will not nourish to the same extent the children confined in air without the full amount of oxygen, and whose blood is sluggish from want of exercise; hence the pale cheeks and weary limbs so often seen.

Such treatment is positive "cruelty to children." Therefore the very first requisite—alas! how often it is the last—in satisfactory education is to provide school-houses which shall fulfill all reasonable requirements for healthful physical life.

Such buildings were quite fully illustrated in the London Health Exhibition by models as well as by plans. It was also the privilege of the writer to visit a number of school-buildings, both in England and in Scotland, while the schools were in session.

The newer buildings seem to be models of healthful arrangements. In the first place, the usual area of the site is sufficient for considerable exercise, and even games; 5,000 and 6,000 square yards are common. There are covered passages, and some covered space for use in rainy weather. The water-closets are *always* at a distance from the building, and *not*, as in one of the newest school-houses of Boston, *under the stairs*, and since the space there was limited only eight were provided for 670 pupils.

In the second place, there are many buildings of only one story. Three stories are not seen in the best houses, unless in the heart of a large city like London or Manchester. The one-story buildings are finished with a pointed roof like a church or chapel. Sometimes a ceiling is placed a few feet from the point of the roof to give an additional chance for top ventilation. In all the buildings visited the same idea of a high overhead-space sufficient for all needs of ventilation was secured by a central hall having such a roof, and the class-rooms opening into it, where the rooms were in two stories.

The windows run up very high, and usually have a separate short portion at the top hung on a pivot, so as to admit air far above the children's heads. There seemed to be plenty of air without the constant opening and shutting of windows and doors, which forms the torment and the risk of a Boston school-teacher's life. Of course, there is a difference of climate to be considered, but we ought to secure the same result in some simple manner. In any case, although the children were far less cleanly than those who attend the public schools in America, the nauseous condition of the air, which is almost always noticed here, was not found in any school visited.

In buildings of two stories the rooms are very high. Those of the Garbals School, in Glasgow, are seventeen feet on the ground floor, and sixteen feet on the second. The rule is to allow to each child ten square feet of floor-space, exclusive of the central hall. In the case of infants eight or nine square feet are allowed.

The common plan of seating the children is not, as in American schools, by individual chairs and desks, but after the old way of long benches, holding from two to twelve children, so that the pupils seem to be huddled together in a smaller space than with us, and consequently the floor-space strikes a visitor as excessive, whereas it is about the same as in our best schools, the gain in cubic feet of air being in the great height of the pointed roof.

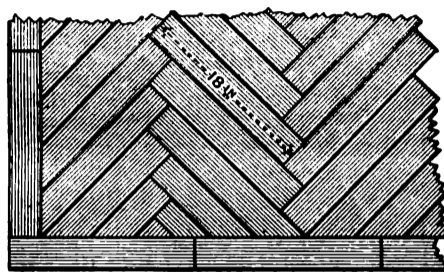
Small class-rooms are coming into use in England, although large rooms with two or three pupil-teachers to assist the head master or mistress are still most frequently seen. It is always possible to throw several of the small rooms into one large one by rolling-shutters or sliding-windows, and in this lies a possibility of quick ventilation. The buildings were very light, and much pains were taken to make them cheerful. Charts of geography, natural history, or astronomy, also pictures, were hung in every room. The blackboard was conspicuous by its absence. The children are encouraged to bring plants and to care for them. All this must have a wholesome effect.

The cost of the buildings and fittings, exclusive of land, varies from \$40 to \$80 per pupil in Edinburgh, and \$75 in Stockbridge. In Birmingham \$55 covered the janitor's house, which is considered an essential, and tarring the play-grounds. One of the lately-constructed schools in Boston cost \$125 per pupil, exclusive of land, and it has several sanitary defects, and not even a room for the shelter of the janitor. The Board School at Carlton Road, Kentish Town, London, is three stories high, accommodates 1,800 pupils, and has three central halls, with noiseless flooring. In the rooms the windows extend to the top. There is a fire-place in every room, with a special air-inlet behind it. The girls' rooms, which were on the second floor, have two tiers of windows, the upper ones for ventilation. In this school, for the current year, a special trial is to be made of extra physical exercises over and above what is already done, which is more than has fallen under the writer's observation in the primary schools in America.

One of the best features seen was the noiseless flooring, made of blocks of wood eighteen inches long by three inches wide and three inches thick, laid on a cement of concrete. The result was as pleasing as surprising. Several masters have become so much interested in the

account of this method of lessening the noise of rooms, as well as of rendering them almost dust-proof, that some account of it may be useful.

The blocks are laid in herring-bone pattern, as shown in the cut, the grain of the wood running as in other *parquetterie*, and not as in wood-paving, on a concrete-bed floated over with a thin layer of Stockholm tar, a little of it being scraped into the joint with the block as it is laid. Twenty-five blocks will cover a yard, not allowing for waste in cutting mitres at the sides of a room.



Frequently some provision is made for the children's dinner.

In the exhibits from France and from Italy school-houses were shown in plan with refectories for the children. In the C plan of the Central Board School of Manchester a large dining-room for the pupils was provided.

THE SANITARY AND INSANITARY HOUSES.

Under the supervision of a special committee, composed of Messrs. H. H. Collins, F. R. I. B. A., W. H. Corfield, M. A., M. D., Rogers Field, B. A., M. I. C. E., Ernest Turner, F. R. I. B. A., and Captain Douglas Galton, C. B., F. R. S., two full-sized model houses have been erected in the exhibition grounds, "with the view of bringing before the public examples of good sanitary arrangements, and also of some of the defects frequently found in dwelling-houses." The insanitary house is fairly representative, with specimens of bad joints to drains, felt damp-proof course, and rising damp consequent, bell and D traps, pan-closets, red-lead joints, and the "interlacing" of lead and iron in the stack of soil-pipes; closet-traps leaking into cisterns, common water-cistern for all purposes, connection of overflows with drains, and of wastes from bath and lavatory with closet-traps, arsenical wall-papers, dust-bin, etc. One or two things shown, however, seem a little too far-fetched; for instance, a rain-water pipe is not frequently found coming down *inside* a house, even if it is connected directly with a soil-pipe. Even the "jerry" builder will, as a rule, put it outside, in order to save himself the trouble of casing it in. In the same way the closed-in cistern at the top of the house would not have a partition so carefully built up around it. Such a proceeding would give extra trouble and *cost money*, and we venture, therefore, to say that in ninety-nine cases out of one hundred the cistern would be merely stuck in some out-of-the-way place, accessible to all dirt, but not carefully built in. The sanitary house is productive of criticism, and seeing that the committee has had an "open credit" in the matter, and that it has in effect adopted as its motto "*ex uno disce omnes*," it is a question whether a better "example, from which all may learn," could not have been presented. A bath-room, in which the floor is handsomely and appropriately fitted with a parquet wood and cork floor, should surely not be hung with an unvarnished paper, which would naturally absorb moisture from steam. If tiles are too expensive, varnish to throw off the moisture would certainly be advantageous. The bath shown is apparently not intended for any but long-legged persons, standing, as it does, exceptionally high. Besides being provided with legs (as attachments), it is perched on the top of wooden blocks, which rest on the lead safe. The bath-waste discharges into a rain-water head, a course the desirability of which may be questioned. The safe-waste is a short piece of horizontal pipe, running out into the open air, and closed with a balance-valve; it is attached to the side of the safe, and with the same level, instead of being brought underneath. The same style is adopted in connection with the other safes in the house, under closets, etc. The housemaid's slop-sink is a small, shallow, enameled tray, which would act very emphatically as a sloppy sink. It might with decided advantage have been of the hopper type, with strainer at side. Further, chamber-slops are very undesirable things to discharge into a rain-water head, as shown, especially when said head is almost immediately under the window. This is the same head receiving

the bath-waste. On the same landing is a hopper-closet, with earthenware P-trap, connected with lead soil-pipe with slip-joint, and with what is known as Spence's metal. The closet is built up (in a rickety fashion) in cement. It may be objected that the absence of standing water in the basin proper would lead to its getting soiled and dirty. A well-known form of valve-closet is shown on the same floor, but hardly in "exhibition form," being unfortunately out of order; the waste-valve, not closing, leaked all the standing water out, and a waste-preventing valve, which was attached, was also out of order, and allowed the cistern to empty itself. The water-supply pipe from the street-main to the cistern was shown running up by the side of the scullery-sink. It would have been a simple matter to take a branch therefrom to the sink, so that drinking-water might be drawn direct, instead of through the cistern. In some few cases, of course, this would not be possible.

The outside work generally—i. e., gullies, inspection-chambers, channel-beds, etc.—would seem both well conceived and carried out in good workmanlike manner, but the plumbing-work inside the house is of medium quality. Many useful suggestions are made as to warming and ventilating, the simplest being a deep bead at the bottom of the sash, allowing the window to be opened for the admission of fresh air through the meeting-rail. The advantages of non-poisonous paints (and dryers) are also insisted on.

(TO BE CONTINUED.)

HEATING AND VENTILATION OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

THE following extracts are made from a paper furnished us by Mr. S. H. Woodbridge, on the ventilation and warming of the Massachusetts Institute of Technology at Boston, in which he is an instructor.

The two principal buildings of the Massachusetts Institute of Technology, together with the Museum of Natural History, are the only structures allowed by law upon the full-sized city block of some three acres area upon which they stand, the Rogers Building occupying the middle position, flanked on one side by the Natural History Rooms, and on the other by the new institute building, each being distant from it nearly 100 feet.

The building to be considered is, therefore, exposed on all four sides. Its dimensions are 150' x 90' on the ground-plan and 75 feet elevation. It contains 40 rooms, whose cubic capacities vary from 3,000 to 60,000 feet, and which are used as lecture and recitation rooms, physical and chemical laboratories, libraries and drawing-rooms, apparatus and storage-rooms.

For the determination of the total air-volume and the distribution required for the ventilation of the building, a schedule of the rooms was made giving the maximum number of occupants for each room and the air-volume corresponding to their number and kind of work, and the required flue-area for that volume's movement to and from each room, with an assumed flue-velocity of 500 feet per minute.

For recitation-rooms and lecture-rooms 1,500 cubic feet per hour are allowed to each occupant. For physical laboratories, where the gaseous products of bunsen flames and electric batteries are likely to act as vitiating agents, 2,000 cubic feet per hour are allowed. For chemical laboratories, which are supposed to be supplied with effective hoods for the collection and removal of offensive or dangerous gases and fumes, and also under which any work evolving a considerable quantity of gas is supposed to be done, 3,000 cubic feet, and for the organic chemical laboratory 4,500 cubic feet, to each occupant per hour. To other rooms of the chemical floor, as the library, balance-room, and volumetric-room, 2,000 cubic feet was apportioned to the individual, because of the proximity of chemical laboratories, and the desirability of being able to produce within them an excess of pressure causing outward air-movement.

Good ventilation based on so low an estimate as 1,500 cubic feet per occupant would not be possible in moist climates, and in the comparatively dry climate of New England that allowance makes the most efficient and economical use of the supply a necessity.

The air-volume distributed to the several floors varies greatly, and excepting a hall-room, on the first floor, seldom occupied when the rest of the building is in use, there is an increase in volume from the basement through the successive floors upward, so that the fourth floor, which is altogether devoted to chemistry, receives very nearly one-third the total air-supply.

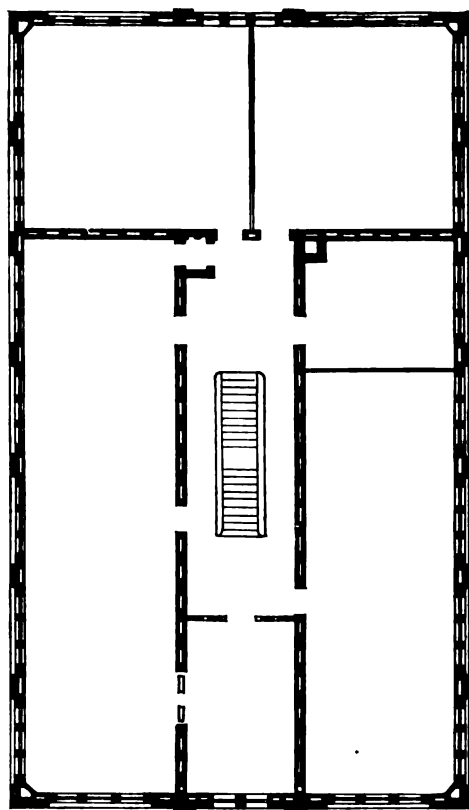


FIG. 1.—PLAN AND SECTION.

If the air-supply were made to move uniformly through the ventilated rooms, a quantity equal to their cubic contents would pass through them once every twelve to thirteen minutes; or if the chemical apartments alone are considered, the supply of 6 to 7 minutes equals their capacity. Actually, however, except in weather with a temperature below 25° Fah., the volume of air passed into the building is greater than the total indicated by the schedule, approaching in the warm weather of October and May 5,000,000 cubic feet instead of 3,500,000.

The general plan of the walls of the building which furnished the flue-spaces for the air-distribution appears in Fig. 1. The building was not planned with reference to any adopted system of ventilation, but on the other hand, the system was adapted to the building as fully as was possible after the work of construction had begun. The nature of the walls made spacious flues possible. Pier two feet square and five feet from centre, running from the stone foundation to the roof, make up the body of the three interior walls. The face of these piers, with the shell-wall connecting them, make a continuous wall-surface. The flues are in general 3'x1', and are "rough" finished, being smoothed with trowel and whitewash brush only.

There are in all 79 flues, including 39 in the outer walls. The distribution of the flues and location and use of the rooms to be supplied and relieved by them is such that all of the outside flues are called into use. Among the objections to outer wall-flues, either as conductors of warm air or outlets for spent air, is their interference with that movement of air within rooms which was desired in order to effect their most complete ventilation.*

* It might be inferred from the above that this system was the only one by which the most complete ventilation of a building can be secured; but as there are other systems with their advocates, for which equal results are claimed, we desire to call the reader's attention to the fact.—EDITOR.

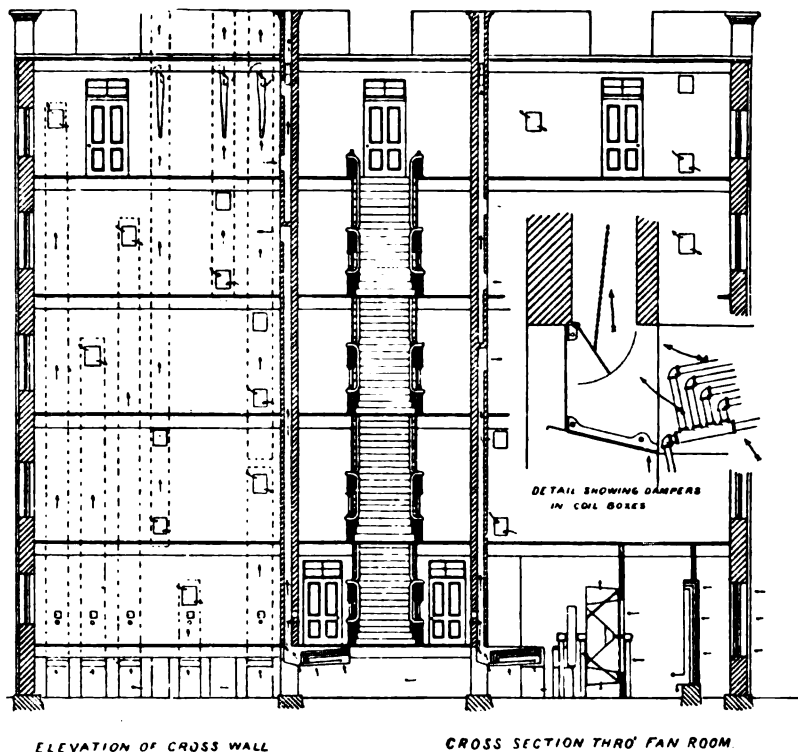


FIGURE 2.

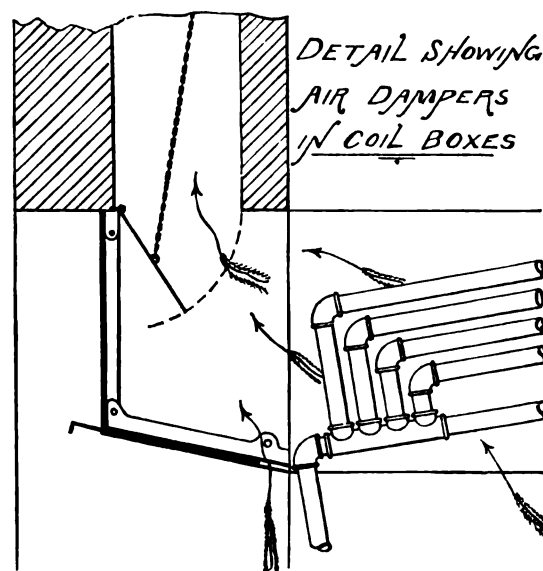


FIG. 3.

To secure such movement, as far as possible, the inlets for air-supply were placed in the walls on the warm sides of the rooms and above the breathing-line, and the outlets were placed at the floor upon the same side, and as nearly as possible beneath the inlet. The current of the air from the inlet to the outlet being thus brought into correspondence with the natural rotary movement of the mass of air within a room having a warm inner and cool outer exposure, the air passed into the room is of such warmth as to remain above the breathing-line until brought down by the chilling effect of the outer wall. Its movement is then across the floor toward the warm side, where it escapes through the outlets near the floor. If the outlet is placed at the outer wall, the tendency is to prevent the cooled and fresh air which falls beneath the breathing-line from traversing the floor before its escape.

The reasons for adopting this arrangement of inlet and outlet may be briefly stated as—

1st. In so far as the action due to their position goes, it is in accord with the natural air-movement within the room, and, therefore, least liable to conflict with the mass movements of air beneath the breathing-line.

2d. The air enters without passing through the lower strata, and by inductive effect moving increased volumes of that air into recirculation.

3d. The fresh and warm air must fall beneath the breathing-line, and traverse the floor before it can escape by the outlet.

4th. That free ventilation requires large volumes of air at low temperatures, and as the entering air would be cool to the room's occupants if exposed to its movement, that the currents may enter above their heads and be unfelt.

5th. That in point of cleanliness it is desirable, since a high wall-register is not likely to become a substitute for either dust-pan or cuspidor.

The original plan proposed the use of mechanical means for the production of currents in weather of a temperature at or above 35° Fah. To this end all air-passages were so planned that the current movement for the flue-supply should nowhere be of greater velocity than that in the flues themselves. It being found, however, that the continual requirements of the school-work made the daily running of an engine necessary, the method of "natural ventilation" was abandoned, and the final adjustments of areas in flue and other passages were made with reference to the use of a fan.

The contraction of flue-areas, by register-faces and other changes, reduced the total flue-area to nearly one-half their available total cross-section,

and at other points the reduction was of equal or greater proportion.

The schedule shows a larger total inlet-area than outlet. This arrangement is intentional, it being desired to maintain within the building a slight outward pressure to prevent in-drafts through windows and walls, and to secure efficient action of hoods and the exclusion of dust.

Each room is virtually an enlargement of the flue or flues connected with it, the air taking a sweep of the room on its passage through the system. The flue which supplies one room with fresh air is generally used for the removal of vitiated air from some room above, as may be seen by Fig. 3. The full-sized flue is often divided into sections, the different sections connecting with separate floors, they being in reality distinct flues, no single flue supplying air to two rooms. The outlet-flues are not so carefully separated as the supply, their division-walls being carried sufficiently high to make it necessary for air to back down twelve or fifteen feet before it can, by reversal of draught, pass from one room into another.

The area of inlets to outlet-flues is less than the flue-area, a condition unfavorable to the production of reversed currents. The outlet-flues are full-sized at the top of the building, and terminate in the open air without cap or cowl. The inlet (warm-air) flues run down to a common plenum formed by the sub-basement of the building, the piers extending down to the floor of the sub-basement and the shell-walls stopping at the basement floor.

The plenum extends under the entire building (Fig. 1). Its floor, of about 14,000 square feet area, is made of hard cement, laid four inches thick upon the sand and gravel bed composing the made land of the "Back Bay." The floor is, in its four sections, made by the three inside walls sloped to central basins, so that they may be washed with a hose and drained. The plenum has at one place about 700 square feet of the flooring above it removed, and the corresponding room-space above is walled in, making it a part of the plenum. Into this space the outdoor air passes through large windows, and by the fan's action the plenum becomes a reservoir of slightly compressed air, with the flues for its vent-pipes.

The fan used is a modification of Sturtevant's type of ventilating-fan. It is twelve feet in diameter and four feet in depth. Its spider carries twelve arms, and at the extremity of each of the arms is a curved and wing-shaped float, forty inches broad at the base and twenty at the front. The arms are bolted to a circular plate forming the fan's back, and to this plate is bolted a cone with its apex toward the fan's mouth. At the front the floats are tied by an annular plate bolted to them, and the system is further stiffened by braces between the front extremity of the floats and the arm next following. The diameter of the fan-mouth is nine feet, a compromise between the ten feet asked for and the maker's customary eight.

The fan is unhooded, and the air passes through its open periphery, the cone facilitating the change in the direction of air. At ninety revolutions, and with an indicated horse-

power of fifteen, the fan is capable of moving against the resistance of the flues, and without the assistance of heat, 85,000 cubic feet of air per minute, the pressure in plenum being something like one-eighth of an inch water column.

For the control of air-movement through the distributing-flues, valves or dampers are placed at their junction with the plenum (see Fig. 2), an enlarged detail of which is shown in Fig. 3. An anemometer placed within the flue will indicate the rate of flow, and a thermometer the temperature of the air-current. By the air-valve the engineer can regulate the quantity of air delivered to each room, shutting the supply off from rooms when not occupied by classes, and directing it to the rooms in use, the flue-currents being made to vary with the requirements of the rooms throughout the day. The valves also serve the purpose of effecting an equal distribution against the tendency of strong winds to diminish the velocity of currents through flues delivering air to rooms to the windward side of the building, or increasing it upon the other side. They are also used to overcome the effect of unequal resistance from other causes, such as length of flues.

This valve (Fig. 3) is hinged, and is operated by a chain which passes up within the flue to a pulley, and through the wall at about four feet from the floor. The plan shows a sliding-damper, also at the base of the flue, which, on being drawn out, increases the inlet-area of the flue, the box connecting the steam-coil with the flue having unintentionally a smaller cross-section than the flue itself.

In the outlet-flues there are two dampers, one at the top to be closed when the flue is not in use, as at night, to prevent the free escape of warm air. The other is at the back of the outlet-registers, and acts as a check-valve in allowing the air to pass freely from the rooms into the flues, and to prevent a movement in the reverse direction. These automatic check-valves are simply flaps of the lightest gossamer rubber cloth, cut into strips about six inches wide, and in length equaling the width of the register-face, and so placed that when no current is passing they hang vertically, overlapping each other about half an inch.

The hallways are supplied with air only by inevitable leakage through the basement floor and the large wall-surface forming one side of the flues.

The water-closet ventilation is through the seats. The bowls are boxed, and the boxing connected with a flue, furnished with steam-pipes. The seats are slightly raised above the upper edge of the bowl, and through this aperture the air passes downward through the seat, entering the boxing and exhaust-flue. There is also a pipe attached to the bowl-vent, which takes air from the hopper at a little above the water-level. The urinals are of the slab type, so washed with water when in use and so flushed immediately after use as to be kept clean, six months' use causing no odor.

(TO BE CONTINUED.)

PRIZES FOR SANITARY ESSAYS.

THE American Public Health Association, at its St. Louis meeting, decided that the prizes from the funds given by Mr. Henry Lamb, of Rochester, N. Y., should be as follows: \$500 for the best paper on "Healthy houses and food the working-classes," on "Sanitary condition and necessities of school-houses and school life," on "Disinfectants, and an individual prophylactic agent for infectious diseases, and appliances and means for saving life, and for protection against the injurious influences of certain work and occupations on health." All papers must be handed in by April 1, 1885.

NEW ORLEANS EXPOSITION.

AMONG the intending exhibitors from Philadelphia at the New Orleans Exposition are the following: of architectural iron, Austin, Opdyke & Co.; of brass and plumbers' work, Cooper, Jones & Cadbury; gas-engines, Schleicher, Schumm & Co.; elevators, Stokes & Parrish; machine-tools, William Sellers & Co.; electric conduits, William W. Johnson & Co.

THE condition of the water of Lake Windermere is now a lively question of debate in England. A Lieut.-Col. Sandys has called it a "gigantic cesspool," while inhabitants to whom the lake is a source of pride and profit stoutly deny that there is any pollution, and that any sewage enters the lake. The Local Government Board has sent an inspector to the lake to report its actual condition.

SIXTY-NINE persons were poisoned a fortnight ago in Margate, Eng., from eating shrimps.

ELECTRIC-LIGHT EXHIBITS AT THE INTERNATIONAL ELECTRICAL EXHIBITION.

IN this series of articles brief notices will be given of the principal exhibits in the department of electric-lighting at the Franklin Institute Exhibition, Philadelphia. Only the newest and most important improvements will be referred to in detail.

1.—EDISON SYSTEM OF INCANDESCENT-LIGHTING.

The exhibit of the combined Edison companies of New York comprises by far the largest number of incandescent-lamps in the exhibition. About 2,000, mostly 16-candle power, are now in use regularly every night. The largest collection (2,600) is arranged on the frustum of a cone about 5 feet to 4 feet in diameter and 12 feet high, raised about 5 feet above the floor, in about 36 spiral rows, several of which are composed entirely of colored lamps. Not more than 500 of these are ever lighted at the same time, however, and usually only about 200. A variety of colored lamps are also used in the parlors of the exhibit to illustrate the illumination of interiors, and many are set on the railing surrounding the inclosure, these latter being turned on only by pressing a key within reach of the passer-by. The Will-o'-the-Wisp colored boy, wearing a helmet with a porcelain lamp of 16-candle power on top, wandering about in an apparently aimless manner and producing, seemingly by no movement, intermittent flashes from his lamp whenever he stops, affords much amusement to the average visitor, who evidently does not see how it is done. Careful observation reveals the wires, not always wholly concealed by the helmet, between it and the collar, and after he is gone one may notice two small metallic plates in the floor where his heels rested.

Besides the lights exhibited in its own space this company lights the offices of the exhibition, the lecture-room, etc., and several private exhibits. The systems, machines, and lamps are mostly those in common use by the Edison companies and need no special description. The three-wire system, however, may be unfamiliar to many readers of THE SANITARY ENGINEER, since it is not that used in the underground plant in New York City, and has been in use but little more than a year, though it is now used in all other places in this country which are lighted by this company from a central station, except Roselle, N. J. About twenty cities and towns, mostly in the Eastern and Middle States, have this system in operation. Among the largest plants are those at Newburg, N. Y. (1,600 lights), Bellefonte, Pa. (1,000 lights), and Tiffin, O. (1,100 lights). The third conductor, of the same size as the other two, and, in the underground system, carried in the same tube, is, briefly, a compensating wire to return or distribute the excess of pressure in the principal lines, and in reality takes the place of the return-wires in two independent circuits, to which this system is equivalent, thus saving one conductor and greatly cheapening the cost of a plant, in which one of the heaviest items is the large copper conductors. Quite a complete exhibit of this system in connection with the underground conductors is shown, sections of the tubes, junction-boxes, manholes, etc., being cut away to expose the interior.

One of the most important of the recent improvements in the Edison system is an extremely delicate and accurate electro-motive force indicator, on the principle of the Wheatstone bridge, which is already in use in most of the central stations and in general wherever the turning on or off of light is not under the control of the engineer. Automatic regulators are also shown in operation, as well as meters, switch-boards, and various other appliances commonly used, which do not call for special mention.

(TO BE CONTINUED.)

SIEMENS' RADIATION-FURNACE.

AT the recent meeting of the Iron and Steel Institute, Mr. F. Siemens contributed a paper on "A New Method of Heating the Regenerative Gas-Furnace." He said that in every description of furnace which had hitherto been designed, either for heating or melting, it had always been considered that the first condition of successful working was to make the space to be heated as small as circumstances would allow, so that the flame might be brought into as intimate contact as possible with the inside lining of the surface, and more especially with the material under treatment. This method of constructing and working furnaces, which was a necessary condition of success in all cases in which it was proposed to obtain a high temperature with the use of solid fuel, was also adopted in regenerative gas-furnaces, which until quite recently were heated on the

same principle. The author, however, had for some time doubted the correctness of this view, and from experience gained in the practical working of this class of furnace, after long and careful trials, had satisfied himself that they should be arranged so that the flame should only radiate heat upon the material to be heated or melted, and not come into actual contact with it, as had hitherto been the case. In the new method of heating, the gas and air-ports, instead of being so arranged that the flame shall impinge upon the materials placed on the bed of the furnace, as hitherto, were at such a height and of such form that the flame passed clear of the objects to be heated, and when these were crucibles, ingots, blooms, or packets of iron, they should be placed sufficiently far apart to allow the radiant heat to have free access all around them. The gas and air ports opened at some distance below the roof of the melting-chamber, and at some distance also from its side walls, so that the gas and air after ignition would have unobstructed space for entering into combustion, and for the free development of the flame, which was kept as much as possible from contact with the roof, walls, or materials on the furnace-bed. Where there were working doors the flame should pass above their level.

The heating of high-temperature furnaces by radiation requires considerable space for the development of the flame. In the regenerative gas-furnace the amount of fuel used does not depend so much upon the intensity as upon the quantity of heat required, whereas in the old furnaces intensity can only be obtained by means of a strong draught, and the consumption of a large quantity of the best fuel. It has been ascertained that in an ordinary crucible steel-melting furnace, heated by means of solid fuel, about two per cent. only of the heat developed is taken up by the steel, so that nearly the whole of the great mass of coke used is expended in getting up and maintaining the furnace at steel-melting temperature. In a regenerative gas crucible steel-melting furnace, on the other hand, when once the steel-melting temperature has been reached, it is easily maintained with a moderate chimney draught, and therefore by the burning of a comparatively small quantity of fuel, which may be of a poor quality, so that the greater part of the heat of combustion is taken up by the steel, and only a very small quantity escapes through the chimney. The following is an actual comparison between an ordinary reheating furnace using solid fuel and one on the regenerative gas principle. The former uses about three tons of a fair quality of coal in a shift of ten hours, while a regenerative furnace of equal capacity takes about two tons for the same time, there being a saving of 33 1/3 per cent. But if both furnaces are merely kept at a welding heat without any cold iron being charged, then the solid fuel furnace requires about 2 1/2 tons of coal per ten hours, while the regenerative gas-furnace takes one-half ton at the outside. So that when it is only necessary to maintain a certain temperature, the regenerative gas-furnace shows an economy of eighty per cent.; while it is 33 1/3 per cent. when both furnaces are bringing iron up to the welding heat. The results here given are from the author's personal observation; but in some cases the advantages gained by the use of the regenerative gas-furnace for heating purposes have been greater, reaching from forty to fifty per cent.

Various applications of the new system have been made. In the heating of boilers by means of gas, the author says: "When it is considered that the temperature of the water in a boiler working at sixty pounds pressure per square inch is only 311° F., while the temperature of gaseous flame may be taken at 4,000° F., it will readily be perceived what a quenching effect the metal of the boiler (which is, of course, at the temperature of the water) has upon the flame. In this case the principle has been followed of letting the active flame consume itself in the open space of the tube, without allowing it to touch the sides until after complete combustion has been effected, when the products of combustion may be brought into direct contact with solid bodies. By such an arrangement complete and smokeless combustion is obtained, with the result of longer life to the boiler, the sides of which more readily deteriorate through direct contact with the flame than from any other cause. As the heat of the flame which is not transmitted by radiation comes after complete combustion into direct contact with the sides or flues of the boiler and its regenerators, it is completely utilized, and a saving of fuel to the extent of twenty-five per cent. is secured by this method of heating."

SMALL-POX in violent form has broken out in Austria.

AMERICAN INSTITUTE OF ARCHITECTS.

(By our Special Correspondent.)

THE eighteenth annual convention of the American Institute of Architects met in the U. S. Government Building, at Albany, N. Y., October 22, the session lasting two days.

This convention was unusually interesting, the attendance greater than for some years past, and the enthusiasm and good feeling very marked. Delegations were present from the chapters in New York, Providence, Boston, Philadelphia, and Cincinnati, and members of the Institute from Nashville, Tenn., Atlanta, Geo., Toledo and Cleveland, Ohio, and from Albany, Rochester, Buffalo and Utica, N. Y.

The proceedings were opened at 10 A. M., the President Mr. Thomas U. Walter, LL. D., of Philadelphia, in the chair, who delivered the annual address.

The morning session of the first day was devoted to business—viz., the reading of the annual report of the Board of Trustees and of the Treasurer; reports from standing committees and chapters, and from the Secretary of Foreign Correspondence; and the appointment of auditing and special committees.

These reports were considered and discussed. The chapter reports were favorable as to membership, and a general tribute was paid to the good effect of the Institute in its bearing upon professional standing of architects, and its appreciation by the public; and they also referred to building laws, and the positions of architects with regard to competitions. This latter question was by common consent referred to the Board of Trustees for action.

The report from the New York Chapter called attention to the bequest or trust fund established by Mr. Willard for an architectural museum, and stated that \$5,000 had been received on account, and that Mr. Pierre Le Brun was about to go abroad on this errand.

The Philadelphia Chapter reported that evening exhibitions were to be inaugurated for wares and apparatus interesting to architects, and exhibitors allowed to explain their merits.

Reports from the newly-established chapters at St. Louis and Indianapolis were read, and lists of officers and members given. The report of the Cincinnati Chapter referred to co-operation work with the plumbers, and medical association for improvement in sanitary hygiene.

The Secretary for Foreign Correspondence acknowledged the receipt of papers read at the French Congress of Architects, and gave the report of the committee appointed by that congress for an architects' protective association.

A paper was read by Mr. H. M. Congdon, entitled "An Architectural Résumé," which was ordered to be printed.

An interesting feature of the convention was an exhibition of drawings showing the different designs for the new Albany Cathedral of All Saints, by Mr. H. H. Richardson and Mr. R. W. Gibson. The former architect also exhibited a wonderful perspective of the new west staircase in the Capitol, as well as a number of photographs of other buildings. Mr. Gibson also offered for inspection a portfolio of sketches in Spain. Drawings of the Dakota building by Mr. Hardenburgh, of New York, and of the new St. James' Church, New York, and a number of other buildings by Mr. Robertson, of New York, were also shown. The new public buildings of Philadelphia were illustrated by five volumes of photographs of sculptured details by Mr. McArthur, architect of the same.

The afternoon was taken up by a visit to the Capitol under the guidance of Mr. Walter Dickson, of the Albany Committee of Arrangements, and under the leadership of Mr. Commissioner Perry, Superintendent of Construction, the visiting architects were shown all the objects of interest. The Senate Chamber, the Court of Appeals, and the Executive Chamber drew forth the warmest expressions of admiration. The architects were presented in a body to the Governor, who cordially welcomed them to Albany.

The Fort Orange Club House was then visited, and the visitor's book was signed, giving the architects the freedom of the club during their stay in Albany. The foundation of the new cathedral was then visited.

The evening session was very fully attended, and rendered very attractive.

A paper was read by Professor Russell Sturgis, of the College of the City of New York, upon the present state of the building art in Europe, and how far our own time has found out the secret of the ancient buildings, taking as examples the Hotel de Ville and the Sacristy of Notre Dame, Paris, the Cathedral of Florence, and buildings of a domestic character. The paper was very thoughtful and scholarly. It was ordered to be printed. This was followed by a paper

by Rev. Mr. Wood, of Sharon, Pa., a member of the International Institute for the Preserving and Perfecting of Anglo-Saxon Weights and Measures.

The paper treated of the science of metrology, and the writer argued that architecture and metrology moved on a parallel line to-day as they did thousands of years ago; that metrology has a scientific basis, and bears the marks of ancient Egyptian wisdom, as proved by standards taken from the great pyramid. The standard British inch and pint conform almost exactly with these. The writer contended that the metric system was a modern one and did not stand the test of use, mentioning the fact that an establishment in Philadelphia after a persistent trial of thirty years was obliged to abandon it.

The paper was a plea for the preserving of the Anglo-Saxon standards, as a matter in which architects were deeply interested. It was ordered to be printed.

This was followed by an interesting address by Professor Ogden Doremus, of New York, upon the destructive influences upon materials used in building, especially that of water acting mechanically as a solvent, and the preservation of building materials from this action. Carbonic-acid gas, one of the weakest forms, yet most potent in dissolving lime compounds, sulphuric and nitric acids, alkalies—viz., ammonia, modification of oxygen—viz., ozone, all operate upon stone and brick, the freezing and thawing of ice causing fracture, and this especially occurs in materials porous to water. Both from bricks and cement a saline efflorescence is brought to the surface after certain conditions of moisture followed by dryness. This cannot be kept in by ordinary paint. The staining and decay of sandstones are common and occur even in marble and granite, all caused by the action of the weather, and of water combined with acids and alkalies. Samples of decayed stone were shown from Trinity Church, New York, and other buildings of sandstone, and also chips from the obelisk in Central Park, showing its decay since it was put up.

The remedy is to put into the mass a material that will prevent its porosity, and a preparation of paraffine and creosote is chosen, as it resists moisture, acids, and alkalies. This is done by heating the surface of the wall, dissolving the paraffine by heat, and painting the wall with it. The professor pleaded most earnestly for its adoption as the best of all treatments ever brought to his notice. The process was patented by Mr. R. M. Caffall.

Experiments were made showing the porosity of stone and brick.

A vote of thanks was unanimously voted to Dr. Doremus.

The convention was called to order on the second day at 10 A. M., and attended to the business of special reports. The Nominating Committee reported the list of officers and committees, and they were unanimously elected—viz.: President Mr. Thomas U. Walter, LL. D., Philadelphia, Pa.; Treasurer, Mr. O. P. Hatfield, New York; Secretary, Mr. George C. Mason, Jr., Newport, R. I.; Trustees, Mr. H. M. Congdon, New York; Mr. A. J. Bloor, New York; Mr. Napoleon Le Brun, New York; Mr. E. T. Littell, New York.

Secretary for Foreign Correspondence, Mr. W. L. B. Jenney, Chicago, Ill.

Committee on Publications, H. Hudson Holly, New York; T. M. Clark, Boston, Mass.; J. McArthur, Jr., Philadelphia, Pa.

Committee on Education, Alfred Stone, Providence, R. I.; Henry Van Brunt, Boston, Mass.; Prof. N. Clifford Ricker, Champaign, Ill.; Prof. W. R. Ware, New York; T. M. Clark, Boston, Mass.

The venerable President, in a few feeling words, returned thanks for the honor conferred upon him. Votes of thanks were passed to Mr. Commissioner Perry for his kindness in conducting the members of the Institute about the Capitol, and to Mr. Walter Dickson, as representing the Albany architects, for their courtesy in entertaining the visiting architects.

The Convention then adjourned, after an earnest invitation from the Art Association, of Nashville, Tenn., to hold its next meeting in that city.

The afternoon was passed very pleasantly. Carriages were provided, and the members, under the guidance of his Honor the Mayor of the City, visited the old Van Rensselaer Manor House, the Schuyler Mansion, and other colonial and modern buildings.

The annual dinner was in the evening at the Delavan House, the members of the convention being the guests of the architects of Albany. The Mayor presided, and the evening was one of good cheer and unalloyed festivity. Speeches

were made by the Mayor, by Mr. McElvey, editor of the Albany *Argus*, and by the visiting architects from all parts of the country. A general feeling of brotherhood was displayed, united with gratitude to the Albany architects for their generous endeavors to make the close of this eighteenth convention one long to be remembered.

AMERICAN PUBLIC HEALTH ASSOCIATION.

No. II.

FIRST DAY—CONTINUED.

(Continued from page 485.)

(From Our Special Correspondent.)

THE next regular paper was by Prof. G. H. Rohe, professor of hygiene, College of Physicians and Surgeons, Baltimore, entitled "The Hygiene of Occupations." It was one of the most interesting papers read, and occupied itself with a discussion of the relative longevity of men in different professions and pursuits. Prof. Rohe based his assumptions on the following table, which shows the occupations by classes, and average age at death of 144,954 decedents in Massachusetts, from May 1, 1843, to December 31, 1874—a period of thirty-one years and eight months:

OCCUPATIONS.	NUMBER OF PERSONS.	AVERAGE AGE AT DEATH.
All classes and occupations.....	144,954	50.90
Cultivators of the soil.....	31,832	65.29
Active mechanics in shops.....	16,576	47.57
Inactive mechanics in shops.....	17,233	43.87
Laborers—no special trades.....	28,058	47.41
Factors, laboring abroad.....	7,025	36.29
Employed on the ocean.....	8,844	46.44
Merchants, financiers, agents, etc.....	15,965	48.95
Professional men.....	5,175	50.81
Females.....	3,343	39.13

Dr. Adolph Alt, St. Louis, Mo., editor of the *American Journal of Ophthalmology*, read a paper entitled "Protective Spectacles for Workmen," in which he showed the danger that existed constantly of chips flying off and striking the eye of the employee. The doctor mentioned the effects that would follow if a chip entered the different parts of the eye, and showed that very often total loss of the eye followed. The agony caused a wounded man by the efforts of fellow workmen to extract the chip were also commented upon. It is often the case that by sympathetic ophthalmia the other eye is lost also, and families are thus left without the means of support. This sympathetic ophthalmia occurred in many cases when the injured and entirely useless eye was not removed; the wife most strenuously objected to such operation being performed on the husband, until by sympathetic action the other eye was lost also. Mica spectacles would remedy all this and had greatly reduced the liability in Germany, where they are in common use. Dr. Alt said employers should be made to pay all damages arising in cases where they did not insist on their workmen wearing spectacles.

Dr. Charles Curtman, of Missouri Medical College, read a paper devoted to the discussion of heating and ventilation. He considered the philosophy of heating and ventilation, and then proceeded to mention the various modes in general use. Hearths, stoves, steam-pipes, water-pipes, hot-air, porcelain-ovens, and other devices, were all thoroughly examined with relation to their economic and sanitary value. The defects in each were alluded to, with the best way to remedy them, and the hot-air method was selected by the reader as being of the most utility.

The last paper read during the morning session was on "The Sanitary Management of Cars and Stations," by Acting Assistant Surgeon W. Thornton Parker, U. S. Army, Fort Union, New Mexico. This paper attracted considerable attention, and the importance of the subject was insisted upon by several sanitarians present. It was discussed by Dr. McCormick of Tennessee, Dr. Bell of Brooklyn, Dr. Thornton of Memphis, and Dr. Cook of Tennessee.

EVENING SESSION.

At 8 o'clock P. M. the association again assembled, and after a couple of selections by the orchestra, Mr. George W. Parker, President of the City Council and Chairman of the Reception Committee, arose and stated that he was not there to speak, but to introduce those who were to speak. He then introduced to the convention Mayor Ewing.

Mayor Ewing said:

"MR. PRESIDENT, LADIES, AND GENTLEMEN—There can be no topic for consideration more important to humanity than that of health, and the sanitary measures to be adopted and prosecuted for its preservation. These topics

have become an important factor in the discussions and reports of the sanitary organizations of the civilized world. Not only have cities and States of the Union regularly constituted bodies for sanitary conference and work, but the Federal Government lends the power of its influence and material aid, as well as the experience and personal co-operation of the sanitary scientists connected therewith, for the furtherance of the purposes to be attained. Thus through intelligent conferences, and an exchange of positive experience, a general knowledge may be acquired, and definite plans for a general sanitary system may be consummated.

"This national association, in its praiseworthy efforts to fulfill its mission and perfect the details so important to the proper conduct of its labors, exerts an influence which is felt throughout the country, and the proceedings of this annual convention will be carefully considered by all who have a proper appreciation of the great importance of the matter committed to your charge. The people of St. Louis welcome you, and I am gratified to have been commissioned by the committee in thus expressing to you the kindly feelings with which they will receive you, and every endeavor will be made to render your stay in our city a pleasure, as well as a season of the interchange of profitable experiences."

Mr. Parker then introduced to the convention Governor Crittenden. The Governor said it afforded him great pleasure, representing the people of this great State, to welcome their delegates to Missouri. Representing the people of this State he bade them welcome. He spoke of the importance of the labors of the convention to the people of the State. They were not restricted by any ethics. He did not want to reflect on many reputable physicians who were bound by ethics, but the scientists' society had broader views than any school of ethics. Any saw-bone might amputate a limb, and they never missed an opportunity. This society, however, discussed higher questions. They discussed matters regarding the public health. Many poor people lived in illy-ventilated rooms, and these people and their children were entitled to the best efforts of the people to care for their health. What means should be adopted in order to have immunity from infectious diseases? Should Asiatic cholera visit this country next season, as is feared, the importance of the scientists' discussions could not be overestimated. In times of peace prepare for war. He then spoke of the brave act of King Humbert of Italy in cholera times in the plague-stricken city of Naples, when he buried the dead, comforted the dying, and exhorted the fugitives to return to their homes and their people. The King's example and remarks had the effect of making the people return and give battle to the dread disease. The speaker said that while they might not be able to prevent cholera or any other disease, they could divest it of many of its terrors. He was sure that when he bade the delegates welcome he voiced the feelings of everybody on this earth. Two humanitarian conventions were now in session in this city, the one to discuss means of preventing disease, and the other to discuss methods of preventing crimes and vices. How glorious it was to have two such conventions running at one time in one city! The investigations of the great men of these people became common property. Men who made discoveries in this way and gave them to the world were greater heroes than Napoleon. The convention came to them as the Good Samaritan, instructing them so that they could avoid their dangers. A few years ago, when a scourge was sweeping over the country their efforts had arrested its progress. A dreaded scourge was now visiting the people on the other side of the water, but their coadjutors were no less active in their efforts to prevent the spread of this terrible disease. Some years ago when the South was afflicted, a young doctor of this city gave up his life in his efforts to save the people of that section from the dreaded scourge. The Governor closed by again bidding the delegates a warm welcome to the State.

Mr. Parker said he regretted to announce that Rev. Dr. Eliot, who was down to address the meeting, was too ill to be present himself, but the doctor had sent his son to read the paper he was to have delivered. Young Mr. Eliot said his father had intended up to a few hours previous to be present, notwithstanding the poor condition of his health, but at the last moment had decided not to, and sent him there to read the address. The speaker then read the address. In it Dr. Eliot expressed his sympathies with the labors of the association. The work of the convention was of the greatest importance. Cleanliness was next to godliness. In the illy-ventilated houses of the poor sobriety

soon gave way to drunkenness. Perhaps no city in the Union had experienced more good from improved sanitary regulations than St. Louis. As he remembered it in 1820 there was hardly a dry cellar in the city. It was no wonder, then, that Asiatic cholera took a firm hold here in 1849. The death-list ran up to 1,200 in a single week during the scourge, and this in a population of only 50,000. The dying were cared for, and the dead properly buried. A fire broke out, and it was thought it might relieve the city of the scourge, but it only made matters worse. The city in all its suffering asked no help from abroad, but bore its own burden. The death-rate in the early days of the city was very great, but improved sewerage and sanitary measures had made it what it now was, one of the healthiest cities in the world. There was room for improvement, of course, and he hoped the improvements would be made.

Dr. Elisha H. Gregory, President of the State Board of Health of Missouri, was introduced, and after a few humorous remarks on the length of his title on the programme, he said:

"GENTLEMEN OF THE AMERICAN PUBLIC HEALTH ASSOCIATION: As a representative member of the Missouri State Board of Health, it is my proud privilege to tender you the hospitalities of our State and city. Every movement having for its object sanitation is important to all mankind. Standing in the front rank in this regard is a knowledge of the causes of disease. I never contemplate disease causation without a sense of humility; the reflection alone comforts me that the difficulties of the subject are simply insuperable. Certainly the greatest minds and the most indomitable industry have been expended upon it with the most unsatisfactory results. Until the causes are known, prevention is out of the question. 'Prevention' is the highest ideal of the sanitist. This is the lofty purpose of your organization. Therefore we welcome you as philanthropists of no ordinary pretensions, but as votaries whose aim is so exalted that the objects proposed cannot be accomplished until all the possibilities of science have been attained. Again, with the assurance of a hearty welcome, coupled with the hope that the deliberations of the meeting may be equal to your most sanguine expectations, God speed the good work."

The address of the President of the Association, Dr. Albert L. Gihon, U. S. N., followed. It was delivered in the forcible but polished language and pleasing manner which characterizes Dr. Gihon's public efforts, and was listened to by a large audience with marked attention. Dr. Gihon announced the subject of his address to be "The Sanitary Responsibilities of the Citizen." He said, by way of introduction, that the child being father to the man, it was natural that there should be many of childhood's traits manifested by its banged or whiskered offspring. As the ordinary juvenile regards his teacher as the arch-enemy of his independence, comfort, and pleasure, his adult descendant likewise instinctively rebels when he is told what he must not do. With the invalid's chuckle of satisfaction when he throws the physician's potion out of the window as soon as the latter's back is turned, he defiantly determines to do the one and not the other. Conscious, therefore, of the doubtful welcome awaiting any one who performs such ungracious offices, the speaker felt some difficulty in assuming the task of introducing the body of sanitary teachers he had the honor to represent, to a community to whom they were as yet strangers. To make the prospective dose still more unpalatable, it was offered to the assemblage, he said, in the form of a presidential address.

After alluding pleasantly to the nature of the task before him, the president said that the past year had made sad havoc in the ranks. After paying tribute to the memory of the deceased, and speaking of the work of the sanitarian, the president said the Public Health Association denounced intemperance in every form, and counseled temperance in all things. It showed how crime was begotten by sin, sin by disease, disease by filth, and filth by ignorance, but it did not seek to dispel ignorance, remove filth, overcome sin, and punish crime by menacing the thinking man with irons, and binding him with thoughts that cut into the flesh, and deprived him of freedom to act. The health of the community was only the health of individual members, and health was only that condition of well-being, well-feeling, and well-doing of each man, woman, and child which enabled him or her to enjoy pleasure and communicate it to others—to be happy and make others happy. The president spoke eloquently of the human form divine, and the necessity of its proper

care, and cultivating, developing, improving, and beautifying it. The first step toward the improvement of the public health was the physical purification of the individual. The association came to St. Louis in the hope of awakening in its citizens that interest in their own welfare which they had no right to disregard. He called attention to the comparative mortality of various nations, and spoke at length of the necessity of proper drainage and ventilation, and care in removing filth from about residences. The adulteration of food was touched upon, and some interesting facts given regarding tainted and diseased meats. The "farce of street-cleaning" was alluded to as a most productive cause of disease.

The means of improving the health of those who lived in cities, the president said, was simple. They should organize, and by concerted, systematic work much good could be accomplished. He had no special plan of organization to suggest—there were many roads to Rome; one should be chosen, and all should travel together; in time the shortest and safest road would commend itself. The organization of the first State Board of Health was alluded to, and the increase in the number of boards, as well as their effective efforts, was described. He spoke at length of the methods that should be adopted by the State boards to secure good results, and followed with a *résumé* of the cause of epidemics in the past ten years. This portion of the address was particularly interesting; in fact, the address throughout was filled with valuable information regarding sanitary measures and the methods of preventing the spread of disease.

In conclusion he said: "Nature is wasteful; germs of all living things are born in needless profusion, and finished unnumbered with the forest leaves, and the myriad swarms of the microscopic world. Only the fittest ultimately survive, and it should be our aim not merely to add a span to each poor, puny life, but to make the strong stronger until the evolution of the race into the highest order of which humanity is capable shall have been accomplished. Every human being cannot be made to live three-score years and ten; some are doomed from birth to prematurely die, and we cannot save them, but we can and ought to save those that have a right to live, who are now slaughtered in hecatombs by preventable diseases."

The evening exercises closed with a march by the orchestra.

(TO BE CONTINUED.)

REGISTRATION OF RAINFALL.

(From a Special Correspondent.)

THE New England Meteorological Society held its first annual meeting at the Massachusetts Institute of Technology, Boston, October 21. The time of the meeting was principally taken up with matters connected with the registration of rainfall. The following is an abstract of a paper read by Desmond Fitz Gerald, M. Am. Soc. C. E., on this subject:

So many calculations are based upon the recorded rainfall of a given locality that it is of the greatest importance that wherever measurements are made they should be made accurately. The recommending of accurate gauges, and the bringing about some uniform methods of location and observation, is a part of the work to which the New England Meteorological Society has addressed itself. Out of many gauges examined by the speaker during the past five years, few have been found to be properly exposed. Some are placed so near to buildings that a large amount of rain is blown into the gauge; others are placed either too high, or not high enough above the surface of the earth. Then there is the greatest diversity in the gauges themselves. For instances, there is no uniformity of diameter (a minor point, to be sure); then many are inaccurate in the receiving-ring; others are made of improper material, while almost all are too shallow, permitting much spattering, and being entirely unfit to hold snow.

A number of gauges were exhibited, illustrating the several points in which serious error is liable to attend the use of ordinary gauges. Three gauges have been manufactured under the direction of the society, after an expenditure of much time and thought by a committee of the society, consisting of E. B. Weston, M. Am. Soc. C. E., Professor Winslow Upton, of Brown University, and the speaker.

These gauges are made of heavy copper, with very accurately turned brass rims. The largest one (No. 1) is 14.85 inches in diameter. In this gauge 100 ounces are equivalent to one inch of rainfall, and the water is weighed on a scale specially made for the purpose, the arm being graduated so

as to read to inches and decimals of an inch. The smaller gauges are eight inches in diameter. In No. 2 the rain collected is transferred to a smaller tube, 2.55 inches in diameter, and measured with a stick in the ordinary manner. In No. 3 a shorter tube is permanently attached to the gauge. All of the gauges are very deep, to serve for the collection of snow as well as rain, and special provision is made to avoid loss by evaporation.

Allusion was made to the extensive experiments now being conducted at Chestnut Hill reservoir, Boston, under a variety of circumstances. In order to examine the influence of height on precipitation gauges have been placed upon towers built for the purpose, the highest being sixty feet above the surface of the ground. The speaker called attention to the importance of permanent locations for gauges, in order that long series of observations may be made under the same conditions; also, to the impossibility of drawing any conclusions as to the permanent increase or decrease of the annual rainfall. The speaker closed by urging all the members to use their influence to establish accurate instruments, and to see that they are accurately observed.

Correspondence.

BRASS TURNING BLACK.

CONNELLSVILLE, PA., October 16, 1884.

To the Editor of THE SANITARY ENGINEER:

As a reader of your valuable paper, would you tell me through its columns the cause of cast-brass turning black when dipped in nitric-acid, when rolled-brass does not? Once or twice I noticed a few pieces of cast-brass that did not turn black. Can you tell me what solution will answer, and leave it its natural color? I also have a small electric battery for medical use, of French make, which has been in use for five years. Of late the current is not regular, it seeming to jump, and is quite severe and painful. Please tell me the cause of it, and if there is any remedy for it. I charge it with mercury and water, as I always have done, but notice of late it takes more mercury to start it than it did before. An answer will oblige, yours respectfully,

JOHN TEMPLETON.

[The turning black is probably due to the fact that cast-brass often contains lead, which is added to make it more easily worked. Sometimes the brass contains other metals as impurities. We are informed that at one time all the brass in the Boston market contained antimony, owing to use for copper of a cargo of Chinese "cash."

With regard to the battery, we venture to suggest that the trouble may be due to imperfect or corroded connections. Better have it looked at by some one familiar with batteries.]

DR. JACQUES BERTILLON, President of the Demographic Service, says the *British Medical Journal*, states that all epidemics in Paris, except scarlet fever, have greatly increased since 1865. In 1880 typhoid fever suddenly increased—twice the number of cases occurred; the returns have not since lessened; measles have gradually increased from 31 to 46 per 100,000 inhabitants. The deaths from whooping-cough, which until 1876 were in the proportion of 10 for 100,000 inhabitants, have since increased, and the proportion is 19.5 per 100,000. Diphtheria has always been on the increase; 43 deaths per 100,000 in 1865-69, and now 100 per 100,000. This increase of mortality from epidemics exists in all the districts of Paris, and especially the environs. Passy, peopled by wealthy residents, is comparatively, and Batignolles very frequently, exempt. As these illnesses generally occur during childhood, Dr. Bertillon suggests that the system of compulsory education ought to be provided with a system of strict medical supervision. The medical inspection of public schools and colleges is very faulty, and in private schools it may be said to be entirely absent.

WHETHER cocoanuts are fruit in the meaning of the English Public Health Act came up for decision the other day in Hull. A meat inspector made complaint that a fruiterer was selling rotten nuts, and as the fact was clearly proven by the condition of a number picked at random from the stock, the defendant's lawyer attempted to evade the law by asserting that cocoanuts were not fruit, and being inclosed in a shell the seller could not know whether they were good or bad. The point was new to the magistrate, who withheld his opinion until he had searched the authorities. He failed to find any definition of fruit or cocoanut which would throw light on it, but held that the nuts came under the section of the law governing similar cases, and fined the dealer 40s. and costs.

"WHO ARE BOUND BY THE BALTIMORE RESOLUTIONS?"

THE Executive Committee of the National Association of Master Plumbers, we learn, congratulate their constituents on the fact that a large number of wholesale firms have signed the so-called Baltimore resolutions.

The following are the resolutions:

Whereas, The manufacturing and wholesale firms in plumbing materials persist in selling to consumers, to our injury and detriment, placing us toward our customers in the light of extortionists, causing endless trouble; and

Whereas, The system of protecting us from this wrong, which draws in its wake other wrongs, is ineffective; it is absolutely necessary to perfect such a system, by united action, which will remove these evils from which we have suffered for years; therefore be it

Resolved, That any firm manufacturing plumbing materials selling to others than master plumbers, we withdraw our patronage from such firm.

Resolved, That the manufacturers of gas-fixtures selling to consumers shall not receive the patronage of any master plumber.

Resolved, That the master plumbers shall demand of the manufacturers and wholesale dealers in plumbing materials to sell goods to none but master plumbers.

Resolved, That this association keep a record of all journeymen and plumbers who place in buildings plumbing materials bought by consumers of manufacturers or dealers.

Resolved, That any manufacturing or wholesale dealers dealing in wrought-iron pipe who sell to consumers shall not receive our patronage.

Resolved, That a committee be appointed by this association in every State and county, for the purpose of reporting to the proper officer at its head in the State any violation of these resolutions.

Resolved, That these measures are just and necessary to our welfare, and a rigid enforcement is demanded.

Resolved, That this convention indorse the above, and urge upon the National Association to perfect and adopt a uniform system of protection for the trade over its entire jurisdiction.

Evidently another mistake has been made, unless these reputed wholesale firms carry on the business of plumbing. By reference to the resolutions it will be noticed that each of the eight resolves require the indorsement or signatures of plumbers, if they are to have any force or effect, since they are distinct declarations of what plumbers propose to do in a certain emergency. The signatures of these wholesale firms involve nothing more in the way of agreement than the same number of signatures of grocers, dry-goods dealers, bank presidents, etc. The question is, if any of these firms have failed to protect their plumbing customers in the past, is there any agreement here to accord them protection in the future? We confess we are unable to find any such stipulation.

THE NAVAL MUSEUM OF HYGIENE.

DURING the past two years there has been forming at Washington what may prove to be one of the most interesting and valuable collections in the capital. It is known as the Museum of Hygiene, organized under the Bureau of Medicine and Surgery of the Navy Department. The museum was put on a permanent basis by act of Congress about two years since. It was intended to be a national collection of materials and models of apparatus and appliances illustrative of sanitary science, of a library of books and papers on the subjects proper to the scope of the museum, and to be the location of a course of lectures by sanitarians of note. The departments of the museum are classified into local hygiene, including soil, atmosphere, architecture, towns and cities; personal hygiene, in the sub-divisions, clothing, food; department of life-saving and preserving; and department of literature and drawings. The sub-classes cover the health conditions of soil, water, air, construction of dwellings, hospitals, schools, workshops, etc., heating, ventilation, and lighting, construction of plumbing, drainage and sewerage, materials of clothing, properties of food, life-saving apparatus and methods, and a collection of tools, drawings, charts, etc., as already mentioned. Dr. John M. Browne, Medical Director of the United States Navy, is in charge. He has recently returned from Europe, where he made considerable additions to the museum and library.

The collections, which have steadily grown, contain at present 650 articles. Sanitary engineering is represented by 174 models of drainage systems, various traps, ventilators, water-closets, and urinals, and specimens of common or interesting defects in plumbing-work.

Household Health has 220 exhibits, chiefly floor and wall coverings (wood and glass veneers, samples of parquetry, art-tiles, lincrusta-walton), and heating and laundry appliances. In a class to be catalogued "Protection and Rescue," are illustrations of serious defects and improved

methods of preserving food, of life-saving appliances, apparatus for disinfection, etc., and a working model of a Siemens crematory, a burglar-proof grave-vault, and a burial casket prepared for distant carriage of a corpse illustrate the subject of disposal of the dead. Under "Military and Naval Hygiene" are grouped a half-size model of a stateroom on board a man-of-war, full-size wash-stands for the ship, a model of a ship's galley, and of a sick-bay, or ship's hospital, of the hospital-ship designed by Medical Director A. L. Gihon, U. S. N., full-size models to illustrate completely the evolution of the air-port, cots for the transportation of wounded on board ship, and a complete outfit of clothing for a private in the marine corps, and samples of the army and the navy rations. There are also models of the new U. S. Army ambulance-wagon and Tompkin's wheeled stretcher, of a barrack-ward, and a block model of the Higgs U. S. Army general hospital. The Bureau of Medicine and Surgery has also ordered the purchase of several exhibits now in the International Health Exhibition, London, among which are Mr. Francis Galton's apparatus for anthropometrical examinations, and Mr. Minnaert-Depunt's display of *sabots*.

A descriptive catalogue, with illustrations, of articles on exhibition in the museum is now preparing. The library of the museum contains 7,049 bound volumes, exclusive of 101 bound volumes of pamphlets and many duplicates. The literature of contagious and infectious diseases is especially full. There are also plans and drawings illustrating house and hospital construction, photographs of food and medicinal plants, and diagrams showing movements of disease. One hundred and thirty-one periodical publications on hygiene and allied sciences are received. An author and subject catalogue is preparing.

Attached to the museum is an experimental laboratory, equipped with the best apparatus for chemical, microscopical, physical, and physiological investigation. Three hundred examinations have been made during the past year.

Reviews of Books.

EXPOSITION INTERNATIONALE D'HYGIENE DE LONDRES, 1884. Chauffage, Ventilation, Désinfection. Notice sur l'exposition et les travaux de la Geneste, Herscher & Cie. 39 pp. 21 plates, folio. Paris, 1884.

Of the numerous circulars and descriptive pamphlets issued by the various patentees and manufacturers whose work is represented in the London Health Exhibition of the present year, the one presented under the above title is so far above the average in interest and value that it seems worthy of a special notice. It is printed in French and English, and contains brief descriptions of the heating apparatus and arrangements for ventilation employed by the firm, the whole being illustrated by a series of excellent plates. Among the important buildings thus illustrated are the new City Hall of Paris, the House of Correction at Nanterre, the Ferrari Asylum at Clamart, the new Courts of Justice at Brussels, the Veterinary School at Alfort, the Normal School at Fontenay, the Royal Monnaie Theatre of Brussels, and the Geneva Theatre.

The firm prefer steam-heating and direct-radiation as far as possible, adopting the principle of heating the walls and not the air. They make use of mechanical propelling-power to move the air in large buildings, the apparatus preferred for this purpose being what is termed a helicoid ventilator.

Unfortunately no data are given as to the results obtained in the several buildings illustrated, so that the book is chiefly valuable as suggesting points worthy of inquiry, and buildings which should be examined by those interested in such subjects when opportunity offers. The English translation is sometimes amusing, as when *Étrive à désinfection* is rendered "disinfecting seating-room," instead of disinfecting-oven.

THE Board of Health of Philadelphia has adopted a resolution declaring the driving of droves of hogs through the built-up portions of the city to be a nuisance prejudicial to the public health, and has requested City Councils to pass an ordinance prohibiting the same.

JOHN S. HOGG, Inspector of Buildings of Baltimore, died October 5.

JOHN HUTCHINS, contractor, who was one of the builders of the Erie Canal, died October 5, at Troy, N. Y.

AN epidemic of diphtheria is creating havoc in several towns of the Dominion of Canada.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING OCTOBER 18, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.		
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.						
NORTH ATLANTIC CITIES.																										
Portland	Maine	35,000	13	19.3	5	38.4	1		5		1				1											
Boston	Mass.	435,000	168	20.1	46	27.3	7		28	6	7	8			10		2	10		4				4		
Lowell	Mass.	71,500	24	17.4	9	37.5			4		3				2			2								
Worcester	Mass.	69,000	27	20.3	10	37.0	1		4	1	3	3					1		1							
Fall River	Mass.	67,000	32	24.8	16	50.0		2	5	1	6				3					1						
New Haven	Conn.	69,500	26	19.4	6	23.0			3		1	3			2			1		2						
Providence	R. I.	125,000	51	21.2	23	45.0	5		3	4	4	1				4	5	2				2				
Total		872,000	341	20.3	115	33.7	14	2	52	12	25	15			18	4	7	16		7		1	2		4	
EASTERN CITIES.																										
Albany	New York	103,000	37	18.7	8	21.6			5	1	1	1					3		1							
New York	New York	1,355,000	648	24.9	293	45.2	17	3	108	19	72	27			11	10	6	40		27		5	6		14	
Brooklyn	New York	670,000	273	21.2	130	47.6	2		39	4	29	12			2	13	2	16		7		2	2		3	
Hudson County	New Jersey	225,000	104	24.0	36	34.6	4	3	9	2	8	6			1		4	2		2			10		6	
Newark	New Jersey	154,000	81	27.4	27	33.3		6	9	5	3	12			1			5		3			1			
Philadelphia	Pa.	940,000	363	30.1	136	37.4	13	2	62	18	17	21			13	2	1	12		1		2	1		1	
Wilmington	Delaware	50,000	30	31.2	19	63.3	1	2	1	3	1	2			2	1		1		1						
Total		3,497,000	1,536	22.8	649	42.2	37	16	231	52	131	81			30	26	13	78	5	42		2	7	20		26
LAKE CITIES.																										
Buffalo	New York	105,000	29	14.3	9	31.0	2	2	1			3			2		1			1						
Rochester	New York	210,000	95	23.5	46	48.4	1		6	1	9	3			5		2	6		1			14		2	
Cleveland	Ohio	140,000	58	21.5	30	51.7			3	2	7	10			4					1						
Detroit	Michigan	650,000	190	15.2	93	51.5	8		13	3	22	18			12	1	1	5		3		8		1	4	
Chicago	Illinois	147,000	51	18.0	35	68.6	2	1	3	1	11	2			1		2	2		1						
Total		1,252,000	423	17.6	218	51.5	13	3	26	7	49	36			24	1	6	14	4	12		14	3		6	
RIVER CITIES.																										
Pittsburg	Pa.	210,000	60	14.8	29	48.3	8		6		5	7			1		4	4		1						
Cincinnati	Ohio	275,000	106	20.1	32	30.1	8		12		10	3			2		4	4		1	2		2			
Louisville	Ky.	137,000	63	23.9	21	33.3	1		7	1	5				6		3		1	3						
Indianapolis	Ind.	94,000	70	28.7	11	15.7	3		6		2															
Minneapolis	Minn.	100,000	28	14.5	15	53.5	1		3	1	5	1			5			2					1			
Evansville	Ind.	100,000	28	14.5	15	53.5	1		3	1	5	1			5			2								
Kansas City	Mo.	100,000	28	14.5	15	53.5	1		3	1	5	1			5			2								
Total		816,600	327	20.5	108	33.0	21		34	2	27	11			14		7	10	2	6		2	1			
SOUTHERN CITIES.																										
District of Columbia	Wh.	133,800	39	15.1	10	25.6	4		4		2	2			1	2				1					1	
Richmond	Col.	60,800	31	23.3	9	29.0	1		5		1				3	2		1	2	1			1		4	
Charleston	Wh.	41,000	16	20.3	3	18.7	1		1		3				1											
Charleston	Col.	32,400	22	35.3	11	50.0			4		3				1										2	
Atlanta	Wh.	25,000	14	29.1	5	35.7			2		2					2										
Atlanta	Col.	27,800	25	46.8	8	32.0			4			1			1	2										
Augusta	Wh.	30,000	7	12.1	2	28.5			2		4															
Augusta	Col.	20,000	17	44.2	12	70.5			2		6															
Savannah	Wh.	30,000	7	12.1	2	28.5			2		4															
Savannah	Col.	20,000	17	44.2	12	70.5			2		6															
Nashville	Wh.	35,100	6	8.9			1				1				1	1							1			
Nashville	Col.	21,800	9	22.0	6	66.6					1	1													2	
New Orleans	Wh.	171,000	67	20.4	19	28.3			7		10	2				7		1		1			1		1	
New Orleans	Col.	63,000	35	28.9	9	25.7			6	1	2					4				1						
Total White		435,900	149	17.8	39	26.1	6		16		21	6			4	12		1	2		2		2		2	
Total Colored		283,800	139	30.9	55	39.5	1		21		13	2			5	8		1	2		2		1	1	8	
Total in 30 U. S. Cities		7,107,300	2,915	21.3	1,184	40.6	92	21	382	74	266	151	1		95	51	34	121	12	71	2	25	29		46	
Total in 28 English Cities																										
October 4.	Total in 28 English Cities	8,762,354	3,379	20.1	104	11	104	11	281	37	68	59			68		59					37		12	54	
" 4.	8 Scottish Cities	1,254,607	508	21.1	4	53	29	2	14	9	16	16			14		16				14		17			
" 4.	16 Irish Cities	858,660	380	22.0	8	27	20	3	14	9	16	16			14		16				1		3			
" 4.	139 German Cities	455,537	160	18.2	8	27	20	3	14	9	16	16			14		16									
" 4.	15 Swiss Cities	455,537	160	18.2	8	27	20	3	14	9	16	16			14		16									
" 4.	15 Swiss Cities	455,537	160	18.2	8	27	20	3	14	9	16	16			14		16									

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending October 18, 1884, in 30 cities of the United States, having an aggregate population of 7,107,300, there were 2,915 deaths, equivalent to an annual death-rate of 21.3 per 1,000. The rate in the North Atlantic cities was 20.3; in the Eastern 22.8; in the Lake 17.6; in the River 20.8; and in the Southern cities for the whites 17.8, and for the colored 30.9 per 1,000. Of the decedents 40.6 per cent. were children under 5 years of age.

Accidents caused 3.1, consumption 13.1, croup 2.5, diarrhoeal diseases 9.1, diphtheria 5.1, typhoid fever 3.2, malarial fevers 1.7, scarlet fever 1.1, pneumonia 4.1, bronchitis 2.4, measles 0.8, puerperal diseases 0.9, and whooping-cough 1.5 per cent. of the total number of deaths. Consumption caused 15.2 per cent. of the deaths in the North Atlantic cities, 15.1 in the Eastern, and 15.1 in the Southern cities among the colored. Diarrhoeal diseases caused 11.5 per cent. in the Lake cities, and 13.9 among the whites in the Southern cities. Diphtheria caused 4.4 per cent. in the North Atlantic cities, 5.2 in the Eastern, 8.5 in the Lake, and 4.0 per cent. among the whites in the Southern cities. The highest mortality from typhoid fever was in the Lake cities, where it caused 5.6 per cent. of the deaths, and

in the North Atlantic cities where it caused 5.2 per cent. Whooping-cough was most fatal among the colored in the Southern cities, having caused 5.7 per cent. of all deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 33 new cases of diphtheria, 58 of scarlet fever, and 59 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 2 new cases of scarlet fever and 33 of diphtheria.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 5 cases of diphtheria and 93 of scarlet fever under treatment October 18.

BALTIMORE, MD.—The report of the Board of Health for the week ending October 18 gives 18.30 as the annual death-rate for the whole population, or 17.87 for the whites and 20.80 for the colored. The deaths numbered 144. Of these 53 were children under 5 years of age. Diphtheria caused 11 deaths, croup 10, whooping-cough 6, typhoid fever 11, malarial fever 4, diarrhoeal diseases 10, consumption 25, acute lung diseases 6, and violence 6.

MASSACHUSETTS.—For the week ending October 11, in 104 cities and towns of the State, having an aggregate population of 1,326,946, there were 437 deaths, which is equivalent to an annual death-rate of 17.84 per 1,000. The principal zymotic diseases caused 122 deaths. Of these, to diphtheria were attributed 19, to diarrhoeal diseases 62, typhoid fever 21, scarlet fever 7, whooping-cough 6, and measles 1. Consumption caused 72 deaths and lung diseases 36. The highest rates recorded were 27.7 in Chelsea and 27.0 in Boston.

NEW ORLEANS, LA.—During the week ending October 11 there were 113 deaths, of which 73 were white and

40 colored. Of the decedents 33 were under 5 years of age. Accidents caused 1 death, consumption 21, diarrhoea 3, diphtheria 6, typhoid fever 1, malarial fevers 10, and pneumonia 1.

BROOKLYN, N. Y.—During the week ending October 11 there were 282 deaths, of which 138 were under 5 years of age. The death-rate was 22.8 per 1,000 annually. Scarlet fever caused 2 deaths, diphtheria 11, whooping-cough 7, typhoid fever 3, diarrhoeal diseases 52, consumption 28, and violence 5.

BOSTON, MASS.—During the month of September there were 931 deaths, which is 66 more than in the corresponding month last year. The annual death-rate was 26.1 per 1,000. Diphtheria caused 24 deaths, croup 17, scarlet fever 15, measles 1, whooping-cough 22, typhoid fever 36, diarrhoeal diseases 186, consumption 142, acute lung diseases 48, and violence 41.

ENGLAND.—The return of the Registrar-General for the week ending October 4 gives the annual death-rate in the 28 large towns of England and Wales as 20.1 per 1,000. The highest rate was in Halifax, 31.4; the lowest in Portsmouth,

FRANCE—Havre.—September 21-27: Deaths, 56; annual death-rate, 27.5 per 1,000. Small-pox caused 1 death, typhoid fever 3, croup 2, diphtheria 1, diarrhoeal diseases 10, and consumption 13.

Rheims.—Week ending October 4: Deaths, 58; annual death-rate, 32.1 per 1,000. Diphtheria caused 1 death, typhoid fever 6, diarrhoeal diseases 13, consumption 7, and violence 1.

BELGIUM—Brussels.—September 21-27: Deaths, 145; annual death-rate, 17.8 per 1,000. Small-pox caused 1 death, scarlet fever 2, diphtheria 2, croup 4, whooping-cough 1, diarrhoeal diseases 28, consumption 25, and violence 2.

RUSSIA—St. Petersburg.—September 14-20: Deaths, 364; annual death-rate, 20.4 per 1,000. Small-pox caused 2 deaths, measles 3, scarlet fever 5, typhoid fever 8, diphtheria 22, whooping-cough 6, diarrhoeal diseases 46, and acute lung diseases 49.

DENMARK—Copenhagen.—September 24-30: Deaths, 113; annual death-rate, 22.0 per 1,000. Measles caused 4 deaths, diphtheria 1, croup 1, whooping-cough 1, typhoid fever 1, diarrhoeal diseases 16, consumption 7, and violence 3.

Association News.

NEW YORK MASTER PLUMBERS.—The meeting of the New York Association of Master Plumbers was held as usual on Friday evening last, about twenty-five members being present, and Mr. John Montgomery presiding. The feature of the evening was the report of the committee which was present at the Executive Committee meeting of the National Association, held at St. Louis. From this report it appeared that the Executive Committee conference resulted in holding the view that the matter of trade protection could better be handled by local associations in their respective localities, but that the spirit of the Baltimore resolutions should be maintained, while one or two features in them were admitted to be impracticable for general adoption, or for the present to be held in abeyance. The report indicated that rash and extreme measures were to be discountenanced, and that in differences between plumbers and dealers compromises should be resorted to rather than the printing of circulars. With regard to the signing of the Baltimore resolutions, it was the opinion of the Executive Committee that since several firms had suggested various conditions it would be best to keep a sharp lookout on the signers of the Baltimore resolutions to see that they were complied with.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—The fifth annual convention will meet, as before announced, in New York, November 5, at the hall of the New York Academy of Medicine, No. 12 West Thirty-first Street, continuing through the 7th. The first session will be held at 8 P. M. on the 5th, when the president's address will be delivered, after which a supper will be served to the guests. Thursday will be devoted to executive session and reading of papers, and on Friday the members will visit Paterson, N. J., inspecting the locomotive-works and other points of interest. On their return a visit will be made to the Stevens Institute of Technology, at Hoboken. Friday evening a session will be held for the reading of papers and discussions. Papers already promised include the following: By W. F. Durfee, The Experimental Steel-Works at Wyandotte; R. W. Hunt, The Original Bessemer Steel Plant at Troy; A. C. Hobbs, Locks and their Failings; William Hewitt, A Novel Form of Hammer Die; F. A. Sheffer, New Method of Constructing a Horizontal Tubular-Boiler; T. D. West, Sound Castings; C. J. H. Woodbury, Measurements of Friction; R. H. Thurston, On the Sliding Friction of Rotation; F. W. Halsey, A New Rock Drill; Wm. Kent, Factors of Evaporation for use in Tests of Steam-Boilers; J. M. Ordway, Experiments on Non-Conducting Coverings for Steam-Pipes.

PHILADELPHIA TRADE-SCHOOL.—The trade-school of the Master Plumbers' Association has not yet been opened, but it is expected that the school will be thrown open in a few weeks.

NATIONAL WHOLESALE DRUG ASSOCIATION.—The following officers were elected at the meeting in St. Louis, Mo., last week: President, C. F. G. Meyer, of St. Louis; Secretary, A. B. Merriam, of Cincinnati; Treasurer, S. F. Strong, of Cleveland.

Notes.

CONSTRUCTION.

TRENTON, N. J.—On the 18th inst. a decision was handed down by Vice-Chancellor Bird in the case of the Board of Health against

the American House. The decision restrains the hotel from sewerage into Petty's Run.

ALBANY, N. Y.—The chain of lakes in the town of Sandlake was yesterday visited by Dr. Alfred L. Carroll, Secretary of the State Board of Health, and Horace Andrews, Jr., Engineer of the Board, with the view of ascertaining what facilities they afforded as a source of water-supply for Albany.—*Troy Times*.

READING, PA.—The new bridge of the Wilmington & Northern Railroad, crossing the Schuylkill River near this city, is almost finished. It has three spans, and the workmen are on the last span. Its cost will be about \$36,000. Work on the bridge was commenced about a month ago, and has since been carried on day and night to have it finished before winter began.

READING, PA.—The city has contracted with the Pennsylvania & Schuylkill Valley Railroad for the construction of a new iron bridge across the Schuylkill River at the foot of Penn Street, and the specifications have been prepared and accepted. The company gives bonds in the sum of \$50,000.

LAKE VIEW, ILL.—The Supervisor has received authority to advertise for a new pump for the water-works of a capacity of 5,000,000 gallons daily.

DISPATCHES to the daily press, dated from Pittsburg, Pa., October 23, state that the National Wrought-Iron Pipe Pool, which was formed last December, was dissolved that day. The Enterprise Iron-Works, of New York, which are owned by the pool, have been ordered to be sold and the proceeds divided among the members.

PASSAIC, N. J.—At the request of B. W. Spencer, the Mayor of the city, the City Council has voted to appoint a committee to confer with the National Sewerage Company to put in the Waring system of sewerage, in consideration of a charge to householders of \$1 for the right to make sewer connections.

THE Government of the Dominion of Canada will place \$140,000 in the estimate during the coming session of Parliament to defray the expense of laying a cable between Nova Scotia and Sable Island.

GRAND RAPIDS, MICH.—The Board of Education opened the following bids for heating and ventilating apparatus for the East Bridge Street and Seventh Street school-houses, October 22: Richardson & Boynton Company for the East Bridge Street school, \$2,394.20; Sproul & McGurrin for the East Bridge Street school, \$2,067, and for the Seventh Street school-house, \$2,057; Miller & Son, for the East Bridge Street school-house, \$2,485, and for the Seventh Street \$2,638. It was voted to let the work to Sproul & McGurrin.

E. H. GAYNOR, of Fayetteville, N. Y., has been awarded contracts for doing the government work on the Savannah River at Augusta, and on the Altamaha River. The contracts represent about \$10,000 each. The work in both rivers is in the nature of jetties similar to those sunk below this city.—*Savannah News*.

CLEVELAND, O., may want fire-tugs. Several fire commissioners returned from New York City October 21, where they had examined the fire apparatus used along the river-front, and the fire-tugs "Havemeyer" and "Gopher Mills." It is expected the board will take action looking to the purchase of a tug.

PHILADELPHIA, PA.—\$90,000 for water-pipe: The Committee on Water of Councils had under consideration at the last meeting the estimate of expenses of the Water Department for 1885, and the amount of money to be asked of Councils, and they agreed to strike out the item of \$12,500 for the purchase of a water-phone, and to ask Councils to appropriate \$90,000 for the laying of a 20-inch water-main on Gray's Ferryroad from South to Thirty-sixth Street.

THE receipts of the Water Department of Philadelphia for the period of 1884 from January 1 to October 18, amount to \$160,796.41, more than the receipts for the same period last year.

MILWAUKEE, WIS.—Sloteman & Kruse have the contract at \$10,000 for heating by steam the new Republican House; also the St. Francis Seminary, at \$5,000. J. & F. Wittig have the contract at \$5,000 for the plumbing in the above-named hotel. H. Mooers & Co. have received the contracts for steam-heating in the following buildings:

Second District Branch School-House, \$3,000; dwelling of H. C. Koch, architect, \$1,500; same for Mrs. H. C. Atkins, \$1,500; same for A. A. L. Smith, \$1,500.

NEW ORLEANS, LA.—At a meeting of the Executive Committee of the Auxiliary Sanitary Association, October 23, the Flushing Committee reported that, in its opinion, repairs could be made to the levee of the Carondelet Navigation Company Canal, between Galvez Canal and the Bayou St. John, for \$10,000. The City Surveyor has estimated the cost of repairs over the entire levee at \$38,000.

BOSTON.—Hawthorne & Co. have the plumbing contract in the "Hotel Nightingale" building at Boston Highlands. Estimated cost, \$5,000.

ATHOL, MASS.—Tucker & Titus, of Boston, have the plumbing by day's work of the new shoe factory built for C. M. Lee. Estimated cost, \$2,000.

PHILADELPHIA.—The bidders on repairing the bridge on Richmond Street over the Aramingo Canal were George Oberhalzen, at \$2,994; John M. Donnelly, at \$2,122.50; S. A. Miller, at \$1,693; A. R. Roberts, at \$2,990; Charles Flood, at \$2,640.

HARTFORD, CONN.—The contract for Seidler & May's new 5-story block on Pearl Street has been awarded to H. B. Philbrick, of this city, for about \$25,000. Work has been commenced and will be pushed so as to have it ready for occupancy by April 1.

HOUGHTON, MICH.—This village, with a population of scarcely 1,600, has issued \$25,000 of six per cent. bonds to supply the citizens with water.

THE MOUNT VERNON, N. Y., Water Company has executed a contract with Tippet & Wood, of Phillipsburg, N. J., for the erection of a plate-iron stand-pipe 10½ feet in diameter and 85 feet high. The contract for the masonry foundation, 17½ feet diameter and 8 feet deep, was awarded to Jacob Hoag. The work is in charge of J. J. R. Croes, C. E.

BROOKLYN, N. Y.—The Board of Supervisors, October 24, received three proposals for heating apparatus for the Thirteenth Regiment Armory as follows: Hugh Dinnew, \$632; Matthew Smith, \$585; Thomas J. Allsop, \$538. The contract was awarded to the last named.

JERSEY CITY.—At the meeting of the Board of Public Works, October 20, the Committee on Pumping and Reservoirs presented a resolution, which was adopted, awarding the contract for repairing Cornish Engine No. 3, at Belleville, to the West Point, N. Y., Foundry Association, at its price—viz., for cast-iron cylinder, 1 cast-iron cylinder-bottom, 1 cast-iron piston and packing-rings, 9 cents per pound finished weight.

UTICA, N. Y., is to have a new storage reservoir covering an area of about sixty acres. To flood the above area will require a dam 60 feet in height and about 2,000 feet in length. The surveys for the above work have been made under the direction of C. F. Carpenter, of Little Falls, N. Y. The water-works are under the control of a private company, and the work will be executed by them next season.

BROWNSVILLE, TEX., property-owners are actively pressing the question of obtaining water-works.

THE village of Cobleskill, N. Y., has decided to build water-works. The Board of Water Commissioners has been organized, with the Hon. J. S. Pindar as President, M. D. Borst, Treasurer, and Clarence Fox, Secretary. Works will be constructed on gravity system from plans made by W. S. Parker, C. E. Estimated cost about \$40,000.

W. S. Parker is now making plans and estimates for water-works for the village of Greenbush, on the Hudson River. Works to be constructed on the gravity system, the supply to be taken from a large spring brook, about two miles east of the village. Two reservoirs will be built of about ten million gallons capacity, with head of two hundred feet above the Hudson River. Mr. G. N. Brandon is assistant engineer.—*Engineering News*.

A CONTRACT for water-works to be completed December 15, 1884, has been let by Ashland, Wis.

UNDER the name of the Association of Licensees of the Consolidated Vapor-Stove Company, an organization has been started, to

which a number of Western firms have made over their patents in lieu of royalties, giving the company control of thirty-seven patents, which include about all there is of any value to the business, and it places every manufacturing company of any note upon practically the same footing in the production of vapor-stoves. The suits which were begun last summer against Johnson & Brandon, of St. Louis, and Myers, Osborn & Co., of Cleveland, have been dismissed.—*Special to the Tribune*.

BROOKLYN.—Bids were opened at the office of City Works in Brooklyn, N. Y., on the 25th inst., for an outlet-sewer, Map O., District 37, running through South Fifth Street, Union and Johnston Avenues, and Knickerbocker Avenue, as follows: Section 1—J. H. O'Rourke, 144" diameter brick-sewer, \$54 per lineal foot; 18" pipe-sewer, \$3 per lineal foot; 15" pipe-sewer \$2.50 per lineal foot; 12" pipe-sewer, \$2 per lineal foot; manholes with iron cover, \$60; street-basins, \$125; total, \$312,050. Crawford Valentine, 144", \$45; 18", \$3; 15", \$2.50; 12", \$2; manholes with iron cover, \$75; street-basins, \$125; total, \$264,740. S. L. Keeney, 144", \$70; 18", \$4; 15", \$3.50; 12", \$3; manholes, with iron cover, \$50; street-basins, \$150; total, \$403,910. George F. Swift, 144", \$43.73; 18", \$5.50; 15", \$4.75; 12", \$4.75; manholes with iron cover, \$82; street-basins, \$150; total, \$274,704.75. John McNamee, 144", \$54; 18", \$2; 15", \$1.75; 12", \$1.40; manholes with iron cover, \$50; street-basins, \$100; total, \$307,114. Edward Freil, 144", \$43.50; 18", \$2; 15", \$1.65; 12", \$1.50; manholes with iron cover, \$51; street-basins, \$150; total, \$250,771. M. J. Dady, 144", \$50; 18", \$3; 15", \$2.50; 12", \$2; manholes with cover, \$65; street-basins, \$100; total, \$290,805. Charles Hart, 144", \$39.47; 18", \$1.75; 15", \$1.55; 12", \$1.30; manholes with cover, \$35; street-basins, \$125; total, \$226,091.25. Contract awarded to Charles Hart.

Section 2—J. H. O'Rourke, 144" diameter brick sewer, \$39.94 per lineal foot at center line; 120", \$26; 90", \$20; 48", \$7; 36", \$7; and 30", \$7, and for 15" pipe sewers, \$2.50; and 12", \$2.00; for manholes and iron covers, \$60 each, and for street basins, \$125; total, \$258,110.66. Crawford & Valentine: 144", \$34; 120", \$24.50; 90", \$20; 48", \$12; 36", \$10; 30", \$8; 15", \$2.50; 12", \$2; manholes, \$60; and basins, \$125; total, \$224,650. S. L. Keeney: 144", \$50; 120", \$40; 90", \$37; 48", \$6; 36", \$5; 30", \$4; 15", \$3.50; 12", \$3; manholes, \$45; street-basins, \$125; total, \$329,740. George F. Swift: 144", \$32.87; 120", \$25.97; 90", \$20; 48", \$13; 36", \$9.50; 30", \$8.50; 15", \$4.75; 12", \$4.75; manholes, \$82; street-basins, \$150; total, \$230,844. John McNamee: 144", \$35; 120", \$24; 90", \$15; 48", \$8; 26", \$5; 30", \$4; 15", \$1.75; 12", \$1.40; manholes, \$44; street-basins, \$100; total, \$225,138. Edward Freil: 144", \$30.55; 120", \$20.60; 90", \$18; 48", \$8; 36", \$7; 30", \$6; 15", \$1.60; 12", \$1.40; manholes, \$51; street-basins, \$150. total, \$198,467.50. M. J. Dady: 144", \$40; 120", \$27; 90", \$21; 48", \$6; 36", \$6; 30", \$5; 15", \$2.65; 12", \$2; manholes, \$60; street-basins, \$100; total, \$259,150. Charles Hart, 144", \$33.60; 120", \$24.20; 90", \$11.75; 48", \$6; 36", \$5.50; 30", \$7; 15", \$1.55; 12", \$1.30; manholes \$35; street basins, \$125; total, \$215,345.90. Awarded to Edward Freil.

CLEVELAND, O.—The bids for the superstructure of the Kingsbury Run Viaduct were opened by the Board of Improvements the 24th inst. For the iron superstructure, not including hand-rail, eight bids were received as follows: Jersey Steel & Iron Co., of Trenton, N. J., \$70,018; Cleveland Bridge & Iron Co., \$79,100; King Iron and Bridge & Manufacturing Co., \$66,695; Berlin Iron Bridge Co., New Berlin, Conn., \$99,990; J. W. Walker, Pittsburg, \$66,400; Detroit Bridge & Iron Works, \$83,800; Pittsburg Bridge Co., \$73,000; Union Bridge Co., Buffalo, \$68,994. The bids for the hand-rail were as follows: Cleveland Bridge & Iron Co., \$4,825; King Iron and Bridge & Manufacturing Co., \$4,000; Berlin Iron Bridge Co., \$4,990; J. W. Walker, \$4,400; Lowe's Forge & Bridge Works, Cincinnati, \$4,850; Detroit Bridge & Iron Works, \$4,815; Manly & Co. Manufacturing Co., Philadelphia, \$4,413; Pittsburg Bridge Co., \$4,750; Union Bridge Co., \$4,500. The aggregate bid of J. W. Walker being the lowest, he is likely to be awarded the contract, which requires ratification by a resolution of the Council.

GOVERNMENT WORK.

BAYOU BARTHOLOMEW, LA., IMPROVEMENT.—Bids have been received as follows: Wootton & Broadway, New Orleans, \$200 per linear mile. Emmick & Feith, Vicksburg, \$75 per linear mile. Contract awarded to Emmick & Feith.

SCITUATE HARBOR, MASS.—Bids for dredging: Boynton Bros., Boston, Mass., 34c. per cubic yard; \$6 per cubic yard for removing boulders weighing over 6 tons. Augustus B. Martin, Boston, Mass., 43c. per cubic yard; \$5 per cubic yard for removing boulders weighing over 6 tons. John McDermott, Cohoes, N. Y., 47c. per cubic yard; \$19 per cubic yard for removing boulders weighing over 6 tons. Contract awarded to Boynton Bros.

COUNCIL BLUFFS, IA.—Bids for labor and materials for post-office building: John P. Weaver, Council Bluffs, Ia., \$13,740. J. M. Rice, Austin, Ill., \$12,900. E. R. Brainerd & Co., Chicago, Ill., \$13,750. No award has been made.

MEMPHIS, TENN.—Bids for joiner's work and wood-flooring opened October 21, for custom-house building: Paradise & Young, Memphis, Tenn.—Joiner's work: white pine and white oak, \$26,444; white pine and ash, \$25,444; white pine and cherry, \$26,944; white pine and bird's-eye maple, \$36,666; wood-flooring, \$2,555; additional \$13.94 per square of 100 feet. A. H. Andrews & Co., Chicago, Ill.—Joiner's work: pine and oak, \$30,996; pine and ash, \$29,330; pine and cherry, \$33,000; pine and bird's-eye maple, \$39,285; wood-flooring, \$3,862; additional flooring, \$30 per square of 100 feet. Mitchell Furnishing Co., Cincinnati, Ohio—Pine and oak, \$30,059; pine and ash, \$29,607; pine and cherry, \$31,559; pine and maple, \$42,500; wood-flooring, \$2,909; additional, \$19 per square of 100 feet. No award has been made.

CONSTRUCTION OF A BOAT-HOUSE.—We give below an abstract of the bids for the construction of a boat-house at the Lewes Life-Saving station. Bids for this work have already been published, all of which were rejected. The plans were slightly modified and new bids were called for, and in response the following bids were received: Franklin C. Monell, Lewes, Del., \$1,739. Augustus M. Cox, Barnegat, N. J., \$2,200. John B. Hudson and James F. Lank, Wilmington, Del., \$1,813. E. J. Norris, Lewes, Del., \$1,899.49. W. H. Virden, Lewes, Del., \$1,650. Jacob Z. Webb, Wilmington, Del., \$2,544. The contract has not been awarded.—*Government Advertiser.*

LIFE-BOAT STATIONS' REPAIRS, at Green Run Inlet, Walchepreague, Hog Island, Assateague Beach, Smith's Island, Va., have been let to James H. Coster, of Baltimore, for \$12,850.

GOWANUS BAY, N. Y.—Proposals for dredging, opened October 16: David S. Arnott, Brooklyn, N. Y., 20 cents per cubic yard; Elijah Brainard, New York, N. Y., 21½ cents per cubic yard; Morris & Cumings Dredging Co., New York, 23 cents per cubic yard; Henry Du Bois' Sons, New York, 19½ cents per cubic yard. Contract awarded to Henry Du Bois' Sons.

GRAND HAVEN, MICH.—Bids for alterations and additions to the life-boat station: Sydney Scofield, Grand Haven, Mich., \$4,125; J. W. Kerr, Grand Haven, Mich., \$4,938; Fred. E. Libby, Muskegon, Mich., \$3,485. The result will be given in our next issue.

GLOBE-LANTERNS AND EXTRA GLOBES.—The following bids were received at the office of the Deputy Quartermaster-General in New York City, October 16, as per advertisement dated September 16: For 400 globe-lanterns, arranged to burn both oil and candle, pattern and size same as standard sample, McFadden & Hatton, 65c. each; S. J. Roby, 79c.; Joseph J. Walton, 72c.; Joseph T. Farrington, 45½c.; Quackenbush, Townsend & Co., 45½c.; James M. Shaw & Co., 40½c.; William Porter's Sons, 65c. and 60c.; J. M. Lawrence, 50½c. and 57½c.; Howard & Morse, 66½c. and 50c. For 800 extra globes, McFadden & Hatton, 5½c. each; S. J. Roby, 7c.; Joseph J. Walton, 10c.; Joseph T. Farrington, 5½c.; Quackenbush, Townsend & Co., 5½c.; James M. Shaw & Co., 5c.; William Porter's Sons, 8c.; J. M. Lawrence, 6¼c. and 7½c.; Howard & Morse, 6¼c.

NEW ORLEANS, LA.—Bids for removing wrecks of steamships Generals Grant and Gresham, and of brig Ailsa, lying in the river in front of the city, were opened October 18 by Captain Thomas Turtle, of the U. S. Engineer Office, as follows: The American Dredging Company, of Philadelphia, offered to do the work for \$33,000; the Atlantic and Gulf Wrecking Company, of Somers Point, Pa., offered to remove the wrecks for \$27,000; Edward R. Lowe, of New York, proposed to do the work for \$37,000; Rittenhouse Moore, of Mobile, Ala., offered to do the work for the sum of \$33,000.

IMPROVING CAPE FEAR RIVER, N. C.—Abstract of proposals for a steam-boiler for the U. S. steam-tug "James T. Easton," opened October 24. (Boiler length, 11' 10", diameter of shell, 5' 6"; height of boiler, bottom of legs to top of shell, 6'; height of steam-drum, 4' 3"; diameter of steam-drum, 4'):

NAME AND ADDRESS.	Price delivered at Wilmington, N. C.	Where Done.	Alternate Proposal for Furnishing and putting in place on Tug, Complete.	Time of Completion or Delivery.	Price.	Notes.
James Clark & Co., Baltimore, Md.	\$1,502 00	Baltimore, Md.	\$1,900 00	Seven weeks.	\$1,900 00	\$1,200 delivered on their wharf. No wood-work included in alternate proposal.
E. J. Codd & Co., Baltimore, Md.	2,500 00	Baltimore, Md.	1,742 00	Sixty days.	1,742 00	
Warden & Mitchell, Philadelphia, Pa.	1,530 00	Baltimore, Md.	1,330 00	Two months.	1,330 00	
Columbian Iron-Works and Dry-Dock Co., Baltimore, Md.	1,450 00	Baltimore, Md.	1,530 00	Six weeks.	1,530 00	
John C. Froehlich & Co., Baltimore, Md.	1,450 00	Baltimore, Md.	1,345 00	Six weeks.	1,345 00	
J. P. Morris, Co., Philadelphia, Pa.	1,347 50	Baltimore, Md.	2,500 00	Sixty days.	2,500 00	
Robert M. Spedden, Baltimore, Md.	2,200 00	Wilmington, N. C.	2,500 00	Six weeks.	2,500 00	
Burr & Bailey, Wilmington, N. C.	1,950 00	Wilmington, N. C.	2,460 00	Six weeks.	2,460 00	
Samuel W. Skinner, Wilmington, N. C.	1,950 00	Wilmington, N. C.	2,460 00	Two months.	2,460 00	
The Percy & Jones Co., Wilmington, Del.	1,650 00	Wilmington, Del.				
Theodore Smith & Bro., Jersey City, N. J.						

BAYOU BEUF, LA., IMPROVEMENT.—Wootton & Broadway, New Orleans, La., \$125 per linear mile. Emmick & Feith, Vicksburg, Miss., \$75 per linear mile. Contract awarded to Emmick & Feith.

SABINE PASS.—Bids for furnishing stone, opened October 17: A. N. Shannon & Co., of Galveston, \$3.72½ per ton; Louisiana Jetty & Lightering Co., of New Orleans, \$3.70 per ton.

BOOKS RECEIVED.

INTERNATIONAL HEALTH EXHIBITION LIBRARY CATALOGUE. Division I., Health; Division II., Education. London, William Clowes & Sons (Limited).

CIRCULARS OF INFORMATION OF THE BUREAU OF EDUCATION. No. 4, 1884. Proceedings of the Department of Superintendence of National Education, at its meeting at Washington, February 12-14, 1884.

TRANSACTIONS OF THE MEDICAL AND CHIRURGICAL FACULTY OF THE STATE OF MARYLAND. Eighty-sixth Annual Session, held at Baltimore, Md., April, 1884.

EXCERPT MINUTES OF PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS. Vol. LXXVIII., Session of 1883-4. Part IV.: Area of Sluice-Opening, James Henry Apjohn, M. Inst. C. E.; Wood Pavements in the Metropolis, George Henry Slayton, Assoc. M. Inst. C. E.; Passage of Upland-Waters through a Tidal Estuary, R. N. Peregrine Birch, M. Inst. C. E.; Dioptric System of Uniform Distribution of Light, Alexander Pelham Trotter, Assoc. M. Inst. C. E.; Old Water-Supply of Seville, George Higgins, M. Inst. C. E.; New Harbor of Trieste, Frederick Bonches; Light Draught Launch, Edward Woodrow Cowan and James Fawcett, Studs. Inst. C. E. Published by the Institution, 25 Great George Street, Westminster, S. W.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
October 25...	24.37	19.10	22.52	28.70	26.26	18.70

E. G. LOVE, Ph.D., Gas Examiner.

FLINT, MICH., has voted down the proposition to light that city by electricity.

THE Supreme Court of Michigan has decided that the contract with the Brush Electric-Light Company made by the city of Detroit for lighting the city by means of the tower system, for the annual sum of \$95,000, is regular. There is still much dissatisfaction with the light, although now that the leaves are falling the towers are doing better in the way of illumination.

A VIOLENT explosion of gas was caused in an Elmira bank, October 20, by the ignition of gas in the vault. Escape of gas had gone on from Saturday night until Monday morning, when the safe was to be opened for business. On going into the vault and striking a match the banker was blown violently out, and it was at first thought had suffered fatal injuries. Nearly every window in the bank building was broken, and other damage was done.

AN English journal states that a very satisfactory test of the electric-light has been made on the war-ship "Colossus," at Portsmouth. In addition to the lighting of the ship below decks by incandescent lamps, the installation includes the fitting of three powerful search-lights, as well as incandescent yard-arm lights. The interior illumination is effected by 150 lights of 20 and 240 lights of 10-candle-power. The current is produced by three Victoria dynamos, coupled to Brotherhood engines.

It has been asserted in the daily press that a Mrs. Alice S. Lewis was suffocated a short time since in New Bedford, Mass., by inhaling gas which escaped from a burner accidentally left open in her bed-room. The fact seems to be that she committed suicide. We are informed that she had been disturbed in mind on account of her house having to be moved to open a new street, and closed herself in her room, opened the burner, and went to bed. When found she was alive, but soon after died. There is but one gas company in the city—the New Bedford Gas Company.

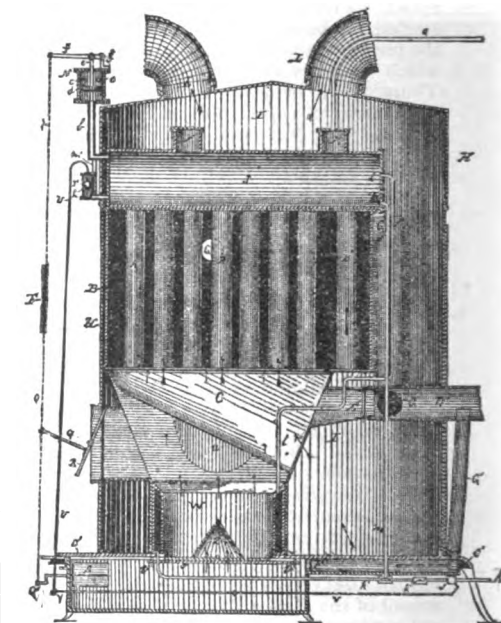
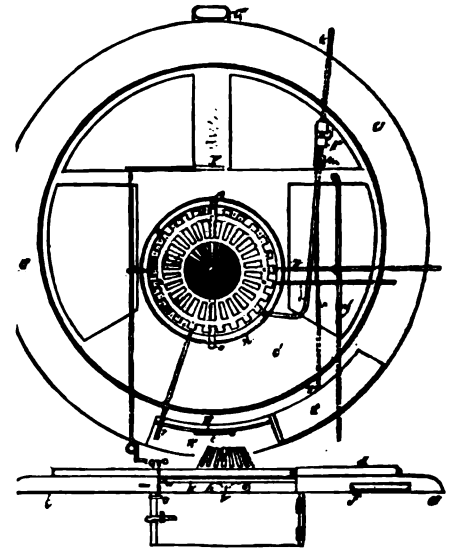
WE condense the following account of the electric-lighting, under the direction of Mr. W. D. Gooch, of the Health Exhibition, at South Kensington, from the London Times: "It is estimated that the total illuminating-power employed in the galleries and grounds is equivalent to the light of half a million candles. The power for driving the electrical machinery has been provided by Messrs. Davey, Paxman & Co., of Colchester. Of the six engines supplied with steam by eleven boilers, two are large double-cylinder horizontal-engines, two are compound-engines, one with and the other without a boiler, on the same bed-plate, one is a portable-engine, and the sixth is a double-cylinder semi-fixed engine. These, working simultaneously, give out 1,192-horse-power. The duties required of these engines may be indicated by an enumeration of the types of generators worked by two of them, taking for the purpose the two large double-cylinder horizontal-engines. These drive a Siemens alternating current machine, excited by a D 6 supplying 220 20-candle-power lamps in the Prince of Wales' pavilion; a small Gerard, supplying four 30-candle-power lamps in offices; three Schuckert dynamos, supplying 39 arc-lights in the machinery-in-motion annex; a Bürgin dynamo for Sir F. Bolton's search-lights of about 8,000-candle-power in the gardens; a Ball unipolar machine for 11 arc-lights in the South Promenade and annexes of about 1,000-candle-power each; a Siemens alternating dynamo for 12 arc-lights in the engine-shed of about 400-candle-power; 10 Edison machines for 1,000 lights in the entrance vestibule and principal dining-rooms of about 20-candle-power each; a large Siemens B 2 machine for 11 lights in the gardens for fountain illuminations of about 8,000 candle-power each; an Elfinston-Vincent for 280 incandescent-lamps of 20 candle-power each in the Swedish Court; a Sunlight dynamo for 15 Soleil lamps of about 500-candle-power each in the water pavilion and cascades in the grounds; three Gramme machines for nine Brockie arc-lamps of about 1,000-candle-

power each in the French and Foreign Courts; and three Gramme machines for five Lea arc-lamps of about 2,000-candle-power each to produce the moonlight effects in Old London. These two engines drive no fewer than 27 dynamos of nine different kinds, supplying 104 arc-lamps by several different makers, and 2,530 incandescent-lamps. From the boilers steam is supplied to a Tower silent high-speed spherical engine of about 25-horse-power indicated, which works a continuous-current dynamo of the Victoria type by the Anglo-American Brush Electric-Light Corporation, with 40 20-candle-power incandescent-lamps in circuit, and also to a Kitson-Parson high-speed engine working another Victoria dynamo, which has lately had 140 20-candle-power incandescent-lamps attached."

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

299,008. HOT-AIR AND STEAM-GENERATING-FURNACE. WILLIAM PULLINGER, Philadelphia, Pa. Filed December 6, 1882. (No model.) Issued May 20, 1884.



Claim.—1. The combination of the drum B, furnished with flues A B', air-chamber C, with chambers w w' for admitting fresh air, smoke-pipes G, jacket H, with pipes I, for carrying off hot air, and fire-box W, all substantially as and for the purposes set forth.

2. In a hot-air and steam-generating furnace, the air-chamber C, with cold-air inlets w w', and passages D, corresponding to similar openings in drum B, in combination with said drum B, fire-box W, base-plate C', and jacket H, substantially as set forth.

3. The combination, in a hot-air and steam-generating furnace, of the boiler J, flues A B', drum B, jacket H, fire-box W, water-pipes I and w, and steam-domes K, all substantially as and for the purposes set forth.

298,777. VISE. CALVIN RIGGS, Worcester, Mass. Filed July 12, 1883. (No model.) Issued May 20, 1884.

298,847. TILE-MOLD. JAMES GRANT, Goshen, Ind. Filed March 18, 1884. (No model.) Issued May 20, 1884.

298,723. FIRE-ESCAPE. SAMUEL BELTZ, Wilmington, Del. Filed December 19, 1883. (No model.) Issued May 20, 1884.

298,725. FIRE-ESCAPE. JOSEPH HENRY BOWLEY, Marengo, Ill. Filed February 16, 1884. (No model.) Issued May 20, 1884.

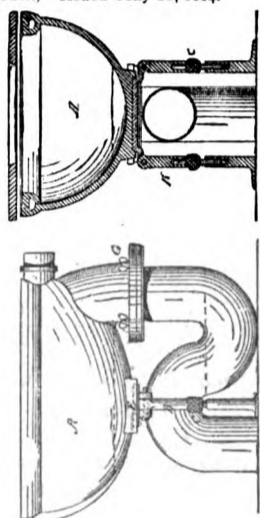
298,727. COMPOUND TO PREVENT THE FUSION OF CINDER. WESLEY CASE, Topeka, Kan., assignor to the Coal Economizing Company, same place. Filed September 27, 1883. (No specimens.) Issued May 20, 1884.

Claim.—The compound for preventing cinders herein described, consisting of bicarbonate of ammonia, saltpeter, bicarbonate of soda, rosin, Epsom salts, common salt, and a base for preventing the mass from cementing together, all in about the proportions described.

298,788. VALVE MECHANISM. DAVID T. ELLIS, Bridgeport, Conn., assignor of one-half to the Belknap Manufacturing Co., same place. Filed January 31, 1884. (No model.) Issued May 20, 1884.

298,742. MACHINE FOR TRIMMING NUTS. GEORGE H. FOWLER, Pawtucket, R. I. Filed October 12, 1883. (No model.) Issued May 20, 1884.

298,804. ADJUSTABLE SUPPORT FOR WATER-CLOSET BASINS. HENRY CORY WEEDEN, Boston, Mass. Filed November 22, 1883. (No model.) Issued May 20, 1884.



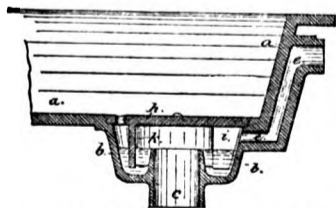
Claim.—1. In combination with the basin or bowl of a water-closet, a supporting-standard of the character described, having legs or supports of adjustable length adapted to carry said basin and support it at the desired height, all substantially as herein described.

2. In combination with a basin or bowl of a water-closet, a supporting or leveling standard of the character described, having legs or supports of independently variable length, adapted to carry the said basin and support it at the desired height and on the desired level, all substantially as herein described.

3. The improved adjustable support for water-closet basins herein described, consisting of a cross-bar, E, connected with vertical extensible standards B, provided with means, substantially as shown, for securing the standards in place at any desired height, all substantially as and for the purposes herein set forth.

4. The improved support for water-closet basins herein described, consisting of a cross-bar, E, carried by extensible standards B, provided with means whereby the length of the standards may be regulated, and also with means whereby the cross-bar may be attached to the standard at a varying height thereon, all substantially as herein set forth, and for the purposes specified.

298,841. TRAP FOR SINKS, &c. HENRY FRIEDRICH, East Port Chester, Conn. Filed January 7, 1884. (No model.) Issued May 20, 1884.



Claim.—1. The sink a, having dish b, upward-extending outlet c, and ventilating-channel e, in combination with strainer h, having flange k, and wings i, substantially as set forth.

2. The combination, in a basin-trap, of an annular dish around the waste-pipe, a ventilating-pipe, a removable strainer-plate having a depending flange and wings at the under side, such strainer-plate having an irregular form at its edges, so that it can only be entered one way into its recess around the dish, substantially as set forth.

298,862. STEAM-BOILER. HOSEA K. KRIEDEL, West Point, Pa., assignor of one-half to Frederick Light, Jr., same place. Filed January 19, 1884. (No model.) Issued May 20, 1884.

298,866. ROTARY-PUMP. GEORGE LENHARD, Detroit, Mich. Filed June 27, 1883. (No model.) Issued May 20, 1884.

298,868. GAS-BURNER. ANDREW B. LIPSEY, West Hoboken, N. J., assignor to William Bell, New York, N. Y. Filed July 2, 1883. (No model.) Issued May 20, 1884.

298,878. STEAM-TRAP. ROBERT B. MORSE, Naugatuck, Conn. Filed December 14, 1883. (No model.) Issued May 20, 1884.

298,884. INJECTOR. WILLIAM R. PARK, Taunton, assignor to the Hancock Inspirator Company, Boston, Mass. Filed September 17, 1883. (Model.) Issued May 20, 1884.

298,887. DITCHING-MACHINE. FAWCETT PLUMB, Streator, Ill. Filed February 1, 1884. (No model.) Issued May 20, 1884.

298,915. OIL-CUP. WILLIAM H. THOMAS, Santa Anna, Cal. Filed October 23, 1883. (Model.) Issued May 20, 1884.

298,952. ROTARY-PUMP. EDWIN BRYAN DONKIN, Bermondsey, England. Filed August 13, 1883. (No model.) Issued May 20, 1884. Patented in England January 13, 1883, No. 216; in France July 12, 1883, No. 156,519; in Belgium July 26, 1883, No. 62,135, and in Germany July 29, 1883.

298,968. OIL-CUP. WILLIAM A. FOSTER, Fitchburg, Mass. Filed March 8, 1884. (No model.) Issued May 20, 1884.

298,970. EAVES-TROUGH HANGER. HENRY JOHN HOFFNER, Athens, O. Filed November 28, 1883. (No model.) Issued May 20, 1884.

298,990. COMPRESSED-AIR WATER-ELEVATOR. JOHN K. LEEDY, Tom's Brook, Va. Filed February 5, 1884. (No model.) Issued May 20, 1884.

298,788. FILTER-PRESS. SAMUEL HENRY JOHNSON, Stratford, county of Essex, England. Filed January 15, 1884. (No model.) Patented in England March 4, 1884, No. 1,048. Issued May 20, 1884.

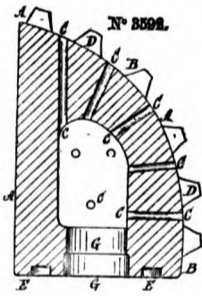
298,850. TILE-MACHINE. FRANCIS M. HARRIS, MAXWELL G. HARRIS, MILO J. HARRIS and MARCUS L. HARRIS, Covington, Ind., assignors of one-fifth to John N. Spining, same place. Filed November 8, 1883. (No model.) Issued May 20, 1884.

299,086. FIRE-EXTINGUISHER. GEORGE W. TAYLOR, ABNER R. COX, WILLIAM CARREL BROWN, and JOHN N. SOUTHERLAND, Belton S.C. Filed January 9, 1884. (No model.) Issued May 20, 1884.

299,088. COMPOSITION OF MATTER TO BE USED AS A FIRE AND WATER PROTECTIVE PAINT. FRANKLIN L. PUTT and J. B. STRATTON, Middlebury, Ind. Filed January 23, 1884. (No specimens.) Issued May 20, 1884.

English Patents.

3,592. AN IMPROVED CONSTRUCTION OF GAS DISTRIBUTOR, IN PLASTIC MATERIAL, FOR DOMESTIC AND LIKE STOVES.

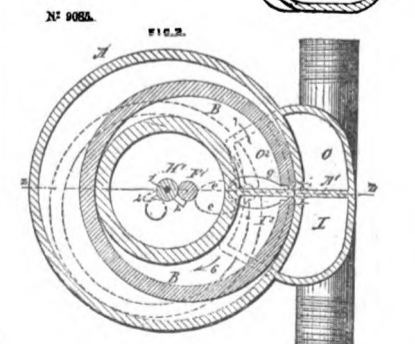
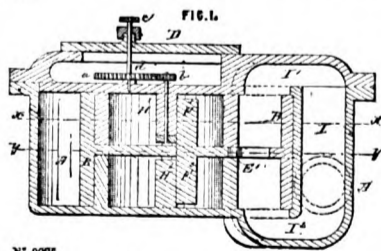


This invention relates to a certain useful distributor of gas in plastic material to be fitted in an ordinary domestic or like stove for heating purposes.

HENRY MARLOW, of the firm of Marlow Smith & Co., 127 Regent Street, in the county of Middlesex, sanitary engineers.

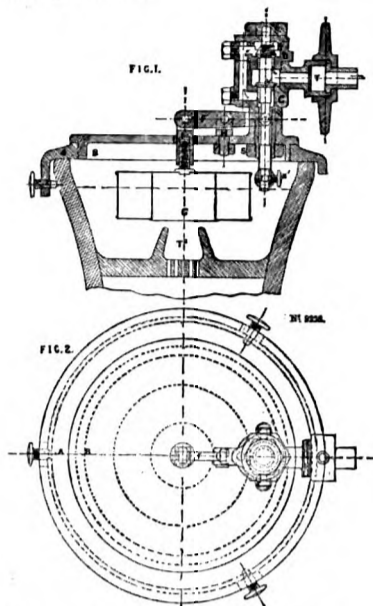
Prov. spec. July 21, 1883. Letters patented January 21, 1884. (Price 4d.)

9,085. IMPROVEMENTS IN WATER-METERS, and in what manner the same is to be performed and particularly described in the specification.



LEWIS HALLOCK NASH, of Brooklyn, in the county of Kings, and State of New York civil engineer. Com. spec. June 17, 1884. (Price 6d.)

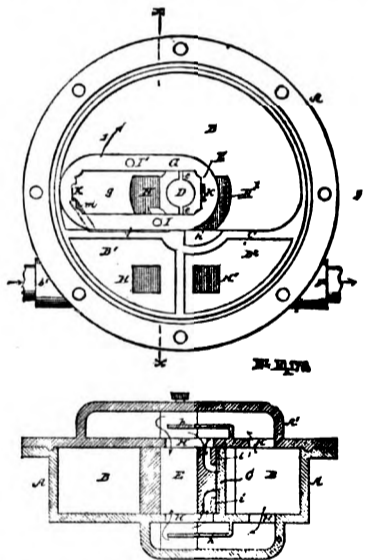
9,228. IMPROVEMENTS IN SELF-SUPPLYING APPARATUS FOR FILTERS, AND IN THE FITTINGS AND APPLIANCES USED IN CONNECTION THEREWITH, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:



The object of the invention is to provide improved fittings for filters, to render them self-supplying; and also an improved form of collecting-vessel, and fittings thereto, for containing the filtered water.

FREDERICK CHARLES BLISS, of 2 Mount Street, Swansea, in the county of Glamorgan, mechanical engineer. Com. spec. June 20, 1884. (Price 6d.)

10,176. IMPROVEMENTS IN METERS FOR MEASURING LIQUIDS.



The invention consists of improvements, fully described and claimed in the specification, in the construction of meters for the measurement of water and other liquids, the objects of the said improvements being the lessening of the friction of the moving parts of the meter, and rendering its action positive and accurate.

FRANK WALKER, of Tombstone, in the county of Cochise, Territory of Arizona, United States of America. Com. spec. July 15, 1884. (Price 6d.)

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—b s, brown stone; br, brick; br st, brick store; b s dwell, brown-stone dwelling; apart house, apartment-house; ten, tenements; ea, each; o, owner; a, architect; b, builder; fr, frame.

NEW YORK CITY.

241 Mulberry st, 6-story br ten and st; cost, \$18,500; o, Philip Braender; a, John Brandt.
240 W 16th st, 5-story br flat; cost, \$15,000; o, James Cunningham; a, Emile Gruwe; b, H. M. Reynolds.
355-357 W 38th st, 2 5-story tens; cost, \$8,500 and \$6,500; o, Sarah McGraw; a, John M. Forster.
55th st, s s, 275 w 10th av, 5-story br silk factory; cost, \$30,000; o, Jacob New; a, J. H. Valentine.
104th st, s s, 250 e 3d av, 4 5-story br tens and sts; cost ea, \$16,000; o, Henry Bernkamp; a, Cleverdon & Putzel.
99th st, 210 e 3d av, 2-story br factory; cost, \$11,500; o, John B. Smith; a, R. N. Anderson; b, John H. Adanson.
93d st, s s, 140 e 3d av, 2-story br boiler-house and coal-shed; cost, \$35,000; o, Geo. Ehret; a, A. Pfund & Son.
100th st, n s, 200 w 4th av, 5-story br ten; cost, \$15,000; o, Sinclair & Mawson; a, Cleverdon & Putzel.
63d st, n s, 250 e 10th av, 2 5-story br and st flats; cost ea, \$15,000; o, Owen Donohue; a, John Sexton.

81st, s w cor 9th av, 4-story br dwell and st; cost, \$13,000; o and b, Eli Martin.
81st st, s s, 30 and 60 w 9th av, 2 4-story br and s dwells; cost ea, \$11,000; o and b, same as last.
81st st, s s, 90 and 112 w 9th av, 2 4-story br and dwells; cost ea, \$10,000; o and b, same as last.
9th av, s e cor 97th st; 9th av, e s, 75.9 s 97th st, and s s 97th st, 100 e 9th av, 3 5-story br tens; cost, \$16,000, \$15,000, and \$14,000; o, Charles Bornkamp; a, Macclay & Davis.
63d st, n s, 225 w 10th av, 5-story br flat; cost, \$16,000; o, Annie Kelley; a, Bernard McGurk.

BROOKLYN.

Floyd st, n s, 156 e Marcy av, 2 3-story fr dwells; cos ea, \$5,500; o, Andrew Froelich; a, Th. Engelhardt; b, John Fuchs and H. Eich & Bro.
Myrtle av, s s, 500 e Evergreen av, 2 3-story fr stores and tens; cost ea, \$5,000; o, John Rueger.
5th av, n e cor Union st, 3 3-story and 2 2-story stores and dwells; total cost, \$35,000; o, William Irvine; a, J. C. Burne; b, W. J. Conway.
Humboldt st, s w cor Sigel st, 4-story br warehouses; cost, \$10,000; o, Martin Worn; a, John Platte.
Madison st, n s, 35 e Tompkins av, 5 2-story bmt and attic b s dwells; cost ea, \$5,000; o and b, Jas. A. Thompson; a, M. Walsh.
Willow pl, w s, 100 n State st, 5-story apart house; cost, \$20,000; o, William Tumbridge; a, Aug. Hatfield.
Macon st, n s, 395 w Marcy av, 2 3-story and bmt br st dwells; cost ea, \$6,500; o, John Fraser.
Fleet pl, w s, 140 n Willoughby av, 4-story br ten; cost, \$8,000; o, Frank B. Moore; a and b, O. K. Buckley.

ALTERATIONS, NEW YORK.

236 Broome st, raise attic, 3-story br extension; cost, \$4,500; o, Ludwig Trunk; a, Wm. Graul.
ALBANY, N. Y.—Madison av, br res; cost, about \$15,000; o, W. H. Pitkin; a, Oden & Wright.
Londonville, fr res; cost, \$8,000; o, A. O. Mather; a, F. H. Jones; b, W. H. Burton & Co.
Architect A. P. Vinal, of Boston, Mass., is preparing plans for the East Boston Ferry-House, appropriation \$20,000; also for the Genl. A. P. Martin school building at Boston, appropriation \$80,000.
CLEVELAND, O.—Cedar av, nr C. & P. R. R., br factory; cost, \$20,000; o, Leslie Sewing Machine Co.; b, Thos. Simmons.
CHICAGO, ILL.—417 La Salle av, st and br dwell; cost, \$15,000; o, A. F. Stevenson; a, Bauer & Hill.
2-4 College pl, br dwell; cost, \$10,000; o, C. H. Curtis; a, Wm. Price & Son.
3552 Prairie av, br dwell; cost, \$18,000; o, Mrs. Annie M. Gentry; a, L. B. Dixon; b, Stevenson & Jordan.
474 W Congress st, br dwell; cost, \$7,000; o, John Gillespie; a, Wm. Thomas.
150-52 Illinois st, br dwell; cost, \$10,000; o, August Schwartz; a, Theo. Karls.
1011 Blue Island av, br st and dwell; cost, \$9,000; o, Frank Dusek; b, Aug. Loula.
11-15 Wendell st, br dwell; cost, \$15,000; o, M. Stock.
242 Indiana st, br dwell; cost, \$8,000; o, H. Goldsmith; a, Strippelman & Co.
Architects Thomas & Rogers, A. Bressler, Julius Zittel, W. Drake, T. M. Randall, and G. A. Morehouse have plans for buildings valued at from \$5,000 to \$7,500.

KENWOOD, ILL.—Br dwell; cost, \$9,000; o and a, Wm. H. Drake.

(Continued on page 516.)

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopoeial requirements. We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

W. H. SCHIEFFELIN & CO.

New York:
175 WILLIAM STREET.

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HYGIENIC AND SANITARY ENGINEERING CO. (LIM.), London, Eng. Sanitary Specialties. P. 516.
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THE NORTH BRITISH RUBBER CO. (LIM.), Edinburgh, Scotland. Rubber for Sanitary Purposes. P. 516.
WOODWARD, JAS. Swadlow, near Burton-on-Trent, England. Sanitary Specialties. P. 517.

BUILDING INTELLIGENCE.

(Continued from page 515.)

PHILADELPHIA, PA.—Jefferson st, bet 25th and 26th, 2 2-story dwells; o, James Craven.
 Wiseman st, bet 12th and 12th, 4 2-story dwells; o, Jas. Stuckey.
 Haines st, bet Cedar Lane and Chew st, 2 dwells; b, John G. Schuler.
 Melrose st nr Montgomery, 2 dwells; b, Wm. W. Murrell.
 State st, bet 30th and 40th, 2 dwells; b, M. E. Irwin.
 Rural lane, bet Allen's lane and Gowan st; 4 3-story dwells; b, Tourison Bros.
 Church st s of Muskgrove, 6 2-story dwells; b, John Breidling.
 Kram av and Mitchell st, 3 dwells; b, Frank Gilbert.
 Queens st nr Township Line, 3 dwells; b, Wm. Kreas.
 Wallace st, bet 23d and 24th, 2 3-story dwells; b, Rush J. Whiteside & Son.
 55 N 2d st, 1 4-story bldg; b, E. M. Daniels.
 7th st, bet Cumberland and Huntingdon, 8 3-story dwells; b, Amos D. Kennedy.
 Ontario st, bet 20th and 21st, 4 3-story dwells; a, Dan'l McNeil.
 Cambridge st, bet 15th and 16th, 8 3-story dwells; b, Benj. Kethem & Son.
 Mt. Vernon st, bet 36th and 37th, 2 dwells, o, Chas. F. Hall.
 Green st, bet Washington lane and Johnson, 2 3-story dwells; b, Watson & Robinson.
 Dove st, e of 4th, 4 2-story dwells; o, Martin Thomas.
 Brunner st, bet Germantown ave and Wayne, 9 dwells; o, W. D. Doughton.
 Paleshop st, bet Lehigh ave and Somerset, 2 dwells; b, Patrick Heron.
 Annan st, bet 11th and 12th, 2 3-story dwells; b, C. O. Neill.
 Erie st, w of 6th, 3 2-story dwells; o, Truffley Cole.

RICHMOND, VA.—Marshall, nr 6th st, bakery and br stable; cost, \$6,000; o, L. Broome; a, A. Lybrook; b, F. Dittending.

West Main st, fr cottage; cost, \$6,000; o, Chas. Lorraine; a, A. Lybrook.

Four Richmond, Va., architects are making drawings for an Episcopal Church, to be erected in the growing west end of the city, in the early spring. The building is to be of granite, brick, or brown stone and will cost about \$45,000. The plans will be selected between this date and November 1. It is said that the chances are in favor of its construction of a very handsome brown stone lately discovered in the county of Buckingham about 100 miles west from Richmond.

There is a good deal of prospective building in Richmond, Va., for next spring, but few plans are yet matured, and the present season is fast nearing its end.

It seems to be conceded that the proposed city-hall at Richmond, Va., cannot be built under the plans already adopted for the amount appropriated—viz. \$300,000.

ST. LOUIS, MO.—Anna and Columbus, 3 2-story tens; cost, \$8,600; o, Mrs. T. Zoelfoener; b, Mr. Frederic Baker & Cabanne, 2-story dwell; cost, \$8,000; J. C. Baker; a, C. May.

Lafayette st and Missouri av, 2-story dwell; cost, \$11,500; o, G. Campbell; a, A. Grable; b, J. Stimple.

Broadway and Pine, 6-story stores and office bldgs; cost, \$170,000; o, Estate of J. J. Roe; a, F. D. Lee.

Jefferson and Lucas sts, medical college; cost, \$20,000; o, St. Louis graduated school; a, F. D. Lee; b, S. M. Roos.

Baton and Menard sts, 4 2-story tens; cost, \$9,000. o, John Cowhoy; b, W. C. Popp.

21 Papin st, 2-story stable; cost, \$10,000; o, J. Schnaier & Co.; b, sub-let.

Grand and Lucky sts, 4 adj 2-story tens; cost, \$7,500; o, S. M. Houselo; a, E. Mortimer; b, J. V. Mayors.

Kosciusko and Barton sts, 2-story warehouse; cost, \$12,000; o, Shaefer & Co.; b, Mich. Risse.

Pine and Leffingwell sts, 2-story dwell; cost, \$16,000; o, J. G. Steedman; b, Z. T. Knott.

Josephine and Chouteau sts, 2-story tens; cost, \$14,000; o, C. Gulath; b, Chas. Wehking.

17th and Elliott sts, 2 adj 2-story tens; cost, \$30,000; o and b, Geo. Waugh.

12th st, nr Howard, 2-story dwells; cost, \$7,500; o, A. H. Laumann; a, B. J. Goesse; b, Goessel & Remmer.

Jefferson av and Washington st, 12 2-story dwells; cost, \$12,500; o, W. Cole; a, L. C. Bulkley; b, A. E. Cook.

21st and Cass sts, 2-story dwell; cost, \$9,000; o, Wm. Vernon; a, T. Furlong; b, M. Laine.

A. Brinke, J. B. Goesse, Hirschner Bros., O. Koenig, C. H. Hirschner, Chas. May, P. F. Meagher, and I. Taylor are architects for buildings valued at from \$5,000 to \$7,000.

ST. LOUIS, MO.—502-4 Pierce st, 3-story br block for post-office; cost, \$14,000; o, A. S. Garretson; a, E. W. Loft; b, Townsend.

420-4 Pierce st, 2-story br st; cost, \$15,000; o, a and b, En Richardson.

Proposals.

PROPOSALS FOR SAFES AND VAULTS FOR THE U. S. TREASURY DEPARTMENT.

OFFICE OF SUPERVISING ARCHITECT,
 TREASURY DEPARTMENT,
 WASHINGTON, D. C., October 23, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 25th day of November, 1884, for supplying the burglar-proof safes and chests, fire and burglar safes

combined, fire-proof safes, fire-proof doors, shell-safes, and single and double steel-lined vault-work required by the Treasury Department, and as may be ordered during the fiscal year ending June 30, 1885, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office on and after November 5, 1884.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
 Supervising Architect.

PROPOSALS FOR IRON-WORK AT JACKSON TENN.

OFFICE OF SUPERVISING ARCHITECT,
 TREASURY DEPARTMENT,
 WASHINGTON, D. C., October 18, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 1st day of November, 1884, for furnishing and putting in place, complete, the Iron Columns and Girders required for the Court-House, Post-Office, etc., at Jackson, Tenn., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
 Supervising Architect.

PROPOSALS FOR PAINTING, BRONZING, AND POLISHING AT CINCINNATI, O.

OFFICE OF SUPERVISING ARCHITECT,
 TREASURY DEPARTMENT,
 WASHINGTON, D. C., October 18, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 8th day of November, 1884, for all the Painting, Bronzing, and Polishing required for the Custom-House and Post-Office building at Cincinnati, O., in accordance with specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
 Supervising Architect.

PROPOSALS FOR IRON-WORK AT ST. LOUIS, MO.

OFFICE OF SUPERVISING ARCHITECT,
 TREASURY DEPARTMENT,
 WASHINGTON, D. C., October 24, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 8th day of November, 1884, for furnishing and fixing in place, complete, the cast-iron ornamental panels for area railing, around the Custom-House and Post-Office building at St. Louis, Mo., in accordance with drawing and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the custodian at the building.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
 Supervising Architect.

PROPOSALS FOR JOINER'S WORK AND WOOD FLOORING AT JACKSON, MISS.

OFFICE OF SUPERVISING ARCHITECT,
 TREASURY DEPARTMENT,
 WASHINGTON, D. C., October 21, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 11th day of November, 1884, for furnishing and fixing in place all the joiner-work and wood flooring required for the Court-House and Post-Office building at Jackson, Miss., in accordance with drawings and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
 Supervising Architect.

IMPROVING FLUSHING BAY, NEW YORK.

ENGINEER OFFICE, U. S. ARMY,
 ROOM 31,
 ARMY BUILDING, Cor. Houston and Greene Sts.,
 NEW YORK, October 9, 1884.

Sealed proposals for Improving the Channel through Flushing Bay, New York, will be received at this office until twelve (12) o'clock noon, on Wednesday, November 12, 1884.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders, may be had on application at this office.

WALTER MCFARLAND,
 Lieut.-Col. of Engrs.

IMPROVING NEWTOWN CREEK, N. Y.

ENGINEER OFFICE, U. S. ARMY,
 ROOM 31,
 ARMY BUILDING, Cor. Houston and Greene Sts.,
 NEW YORK, October 10, 1884.

Sealed proposals for Improving the Channel of Newtown Creek, N. Y., will be received at this office until twelve (12) o'clock noon, on Wednesday, November 12, 1884.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders, may be had on application at this office.

WALTER MCFARLAND,
 Lieut.-Col. of Engrs.

PROPOSALS FOR HARBOR IMPROVEMENT.

U. S. ENGINEER OFFICE,
 BUFFALO, N. Y., October 15, 1884.

Separate sealed proposals, in triplicate, will be received at this office until 11 o'clock A. M. (75th meridian time) on the 15th day of November, 1884, for dredging the west channel and repairing the East Breakwater at Dunkirk Harbor, N. Y.

Specifications, blank forms, and instructions to bidders may be had on application at this office.

EDWARD MAGUIRE,
 Capt. of Engineers, U. S. A.

STONE FOR DELAWARE BREAKWATER HARBOR.

UNITED STATES ENGINEER OFFICE,
 1125 Girard Street,
 PHILADELPHIA, PA., October 16, 1884.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock M., of Saturday, November 15, 1884, and opened immediately thereafter, for 23,000 tons of stone, more or less, to be used in the construction of the Delaware Breakwater Harbor.

For blank forms, specifications, etc., apply at this office.

W. H. HEUER,
 Maj. of Engineers, U. S. A.

OFFICE OF CHIEF QUARTERMASTER,
 DEPARTMENT OF THE EAST,
 GOVERNOR'S ISLAND, N. Y. H., October 15, 1884.

Sealed proposals, in triplicate, subject to the usual conditions, will be received at this office and the offices of the Quartermaster at the posts mentioned below, until 12 o'clock M., Eastern time, on the 15th day of November, 1884, at which time and places they will be opened in the presence of the bidders, for the construction of one set of barracks of brick, or frame, at each of the posts of Fort Adams, R. I., and Fort Hamilton, N. Y. H., in accordance with plans and specifications, which can be seen at this office, and at the offices of the Post Quartermaster at Fort Adams, R. I., and Fort Hamilton, N. Y. H.

One copy of this advertisement should be securely attached to each triplicate proposal, and be mentioned therein as comprising part of it.

Blanks for proposals and information as to the manner of bidding, etc., can be obtained at this office.

Proposals must be accompanied by a guarantee with two sureties, in the sum of two hundred dollars.

A proposal not accompanied by such a guarantee will not be considered.

Envelopes containing proposals should be marked "Proposals for Construction of Barracks."

The Government reserves the right to reject any or all bids.

ALFRED J. PERRY,
 Asst. Quartermaster-General, U. S. A.

PROPOSALS FOR DREDGING.

U. S. ENGINEER OFFICE,
 2107 Pennsylvania Ave.,
 WASHINGTON, D. C., October 14, 1884.

Sealed proposal for Dredging in York River, Va., will be received at this office until 12 M. on November 20, 1884, and opened immediately thereafter.

Specifications, containing detailed information, and blank forms of proposals, can be obtained at this office. The right to reject any or all proposals is reserved.

S. T. ABERNETHY,
 U. S. Civil Engineer

Repairs to the steam-heating work of the east wing, Insane Asylum, Ward's Island, N. Y. Until October 31. Address COMMISSIONERS OF THE DEPARTMENT OF CHARITIES AND CORRECTION, New York City.

Dredging in following harbors: In Wareham Harbor, Mass., appropriation \$10,000. In Harbor of Refuge, Wood's Holl, Mass., about 7,000 cubic yards. Until October 31. Address GEORGE H. ELLIOT, Lieut.-Col. Engrs, Engineer Office, Newport, R. I.

Lateral sewers in Avondale, O., District No. 1. Until November 4. Address W. ELWOOD WYNN, Corporation Clerk of Avondale, Room 23, Sinton Building, Cincinnati, O.

Light-house supplies, including blocks, brushes, chimneys, cordage, dry-goods, engineers' stores, flags, and bunting, hardware and tools, lamps and lanterns, lumber, paints, oils, etc., ship chandlery, soap, tinware, wicks, window-glass, wood and willow-ware, and miscellaneous articles. Until November 5. Address Capt. GEORGE BROWN, U. S. A., Inspector, Tompkinsville, N. Y.

Mineral and lard oil for light-house service. Until November 6. Address Vice-Admiral SPEER C. ROWAN, Chairman Light-house Board, Washington, D. C.

Furnishing headstones for soldiers' graves (4,000 marble stones, more or less). Until November 6. Address R. N. BATCHELDER, Deputy Quartermaster General, U. S. A., Office of National Cemeteries, Washington, D. C.

Fencing, flagging, digging down, and filling lots on certain streets in Brooklyn, N. Y. Until November 6. Address WILLIAM H. FLERMAN, Commissioner of the Department of City Works, Brooklyn.

Opening, grading, etc., Druid Hill Avenue, Baltimore. Until November 6. Address GEORGE H. CARMAN, No. 11 Morse Building, 50 West Fayette Street, Baltimore, Md.

Materials and labor for court-house at Muncie, Ind. Until November 6. Address WILLIAM DRAGOO, Auditor, Muncie, Ind.

Eight-inch tubes for converted rifles. Until November 7. Address S. V. BENET, Brig. Gen. Chief of Ordnance, U. S. Ordnance Office, Washington, D. C.

Brick buildings at Camp Rice, Tex., 17 in number. Until November 11. Address Major J. G. C. LEE, Chief Quartermaster, San Antonio, Tex.

Dredging channel and repairing breakwater in Dunkirk, N. Y., Harbor. Until November 15. Address Capt. EDWARD MAGUIRE, U. S. Engrs, Engineer Office, Buffalo, N. Y.

23,000 tons of stone for Delaware Breakwater Harbor; Until November 15. Address Maj. W. H. HEUER, U. S. A., Engineer Office, 1125 Girard Street, Philadelphia.

Dredging and rock excavation in Caloosahatchie River, Fla., Suwanee River, Fla., and Harbor at Cedar Keys, Fla. Bids must be separate for each work. Until November 18. Address Capt. WILLIAM T. RUSSELL, U. S. Engineer Office, Jacksonville, Fla.

Erection of brick court-house, stone facing, 40'x75', tower. Architect, J. F. Schneider, 933 F Street, N. W. Washington, D. C. Until November 24. Address L. S. WALKER, Clerk of Board of Supervisors of Shenandoah County, Woodstock, Va.

The municipality of the city of New Westminster are prepared to offer the sum of \$50,000 as a bonus to any person or company that will build, maintain, and run a railway from the city of New Westminster to the Canadian Pacific terminus at Port Moody. Said offers to be sent into this office on or before the last day of November, 1884. By order, A. J. ALPORT, C. M. C., City Clerk's Office, New Westminster, B. C.

Building iron screw-steamer for Light-House Board. Until December 1, 1884. Address S. C. ROWAN, Vice-Admiral, U. S. N., Chairman, Office of the Light-House Board, Washington, D. C.

Building new city-hall at Richmond, Va. Until December 1. Address W. E. CUTSHAW, City Engineer.

Iron hand-rail for bridge (3,000 feet) wanted. Address SEEKONK RIVER BRIDGE COMMISSION, Grand Street, Providence, R. I.

Erecting an electric-light plant (incandescent) on Ward's Island, N. Y. Address the COMMISSIONERS OF THE DEPARTMENT OF CHARITIES AND CORRECTION, New York City.

European Advs.

This Hotel is now completely re-decorated, and combines every Modern Improvement and Luxury.
 The Langham Hotel, LONDON.
 Accommodates 500 Guests. Built on a Gravel Soil.
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AERATION OF SURFACE WATER.

In another column we print a report by Professor Leeds on the condition of the Philadelphia water. The report is particularly interesting on account of the favorable results which appear to have been obtained from experiments on the artificial aeration of water and from the proposal to apply the process on a larger scale still.

There is no question that the oxygen which surface waters dissolve from the air plays a very important part in the self-purification of water in reservoirs and running streams. Bodies of water, inoffensive in summer, become offensive when covered with a winter's coating of ice. Pallas, a Russian traveler of the last century, found that all the rivers of Siberia where the current was slow became corrupt after they were covered with ice, and the fish were driven into the sea or into more rapid streams. Professor Leeds, two winters ago, found that the unpalatability of the Schuylkill water at that time was due to the decomposition of organic matter contained in the water or deposited at the bottom of the stream, the offensive substances being the result of putrefactive decay out of contact with oxygen. This condition of things was favored by the ice-covering of the canals and bays. It is, indeed, a somewhat wide-spread popular idea that there is a deficiency in the aeration of water under ice, and in a number of cases the ice has been cut solely with a view of letting the water come in contact with the air.

The matter of the oxygen in natural waters has occupied the attention of many chemists. The late Dr. Miller determined the amount of dissolved oxygen in the Thames water above, opposite, and below the London sewers, and found that in the fouler parts of the stream the amount of oxygen became reduced nearly to zero. More recently in France stress has been laid upon the amount of dissolved oxygen as a measure of the purity of water. Almost the last experiments of the late Angus Smith were on the effect of aeration of sewage and impure water, and an interesting research in a similar direction is now being carried on by Dr. Odling, in the University Laboratory, Oxford.

It is possible that some chemists have been inclined to overrate the part played by oxygen in the work of restoring polluted streams to their natural condition. It is certainly not the only effective agency; it is assuredly an important one. In the ordinary process of sand-filtration, moreover, the slight observed reduction in the amount of dissolved organic matter is due to the oxygen which the water holds in solution, or which it takes into solution from the previously aerated sand.

When we come to the artificial aeration of surface water to improve its quality for domestic use, we come to a matter which has been frequently discussed, but, so far as we know, the attempts have generally been limited to letting the water flow over dams or to agitating it by means of fountains. We are informed that some years ago the small filter-bed then in use at Columbus, Ohio, was troubled by growths of vegetable matter, and that the trouble was mitigated by arranging a small jet fountain to throw a fine shower over the water and break up the surface. At Springfield, Mass., on account of similar trouble, the water was allowed to flow some distance in an open shallow trench. It has also been pro-

posed to agitate the surface of reservoirs by small splashing steamboats. All these means, however, accomplish very little. In our issue of October 23 was described a more elaborate device for aerating the water in a reservoir or pond. Whether this antedates Professor Leeds' idea or not we do not know, but as far as we have information Professor Leeds is the first to propose the actual aeration of water in the mains, and we shall await with great interest the results of the experiments in Philadelphia.

At the same time we would caution our water engineers that, even if the experiments are successful, we shall not have a panacea for all the disagreeable conditions to which stored surface waters are liable. The so-called "cucumber" and "fishy" tastes have frequently been observed in waters of remarkable organic purity with no deficiency of free oxygen. We can hardly hope that aeration will cure these ills, although the experiment may be worth trying in some cases.

THE AMERICAN PUBLIC HEALTH ASSOCIATION AND THE CONFERENCE OF STATE BOARDS OF HEALTH.

THE twelfth annual meeting of the American Public Health Association in St. Louis has been a pleasant occasion to those who were able to be present, and the papers presented, with the report of the discussions, will no doubt form a volume of goodly size and of considerable interest. No troublesome questions seem to have arisen, and the social element was very pleasant. Perhaps this harmony was due in some degree to the fact that the points of sanitary administration upon which there are differences of opinion were discussed in the Association of State Boards of Health, an organization which met at the same time and place, and in which some interesting topics were considered, and especially the subject of the prevention of cholera.

The conclusions of the State Board Conference were accepted without modification by the association. These conclusions coincided with the views contained in the paper read to the conference by Dr. Smart, of the National Board of Health, and call upon Congress to provide for inspectors at foreign ports, etc., substantially in accordance with the plan proposed by the Congressional Yellow Fever Commission in the spring of 1879.

The National Board of Health was indorsed by implication, but neither the association nor the conference of representatives of State Boards seem to have discussed the present condition of that body or the means for improving it.

The plan drawn up by Dr. Hewitt and presented to the conference by the State Board of Minnesota met with little favor. This plan contemplated the perfecting and strengthening of the organization of representatives of State Boards, creating in fact a sort of National Health Council without funds.

The general feeling among the older members of the association was evidently that of regret at the present condition of national public health legislation, of belief that no improvement in this respect is to be hoped for under the present organization of the National Board of Health, and of unwillingness to recommend any change in that organization so long as the members of the board do not propose such change.

Possibly, however, some definite plan of reorganization may be presented at the meeting of the conference of State Boards, which is to be held in Washington in December next.

THE SEWERAGE OF PARIS.

At the meeting of the French Association for the Advancement of Science at Blois, M. Alfred Durand-Claye discussed with his usual vigor the sewerage and sewage of Paris. He reiterated his views—well-known to our readers—of having the sewers carry all the sewage and other liquid refuse, and of purifying the sewage by irrigation. He stated that after all sorts of trials and tribulations, and after having run the gauntlet through three successive ministries, the engineers of the city had hoped that they had accomplished their object and that in the near future the entire sewage would be distributed upon a very sterile and very permeable tract of land in the forest of St. Germain. At the last moment, however, objections have been raised by the military authorities on strategic grounds, and on account of two forts which are situated on either side of the territory to be irrigated. How long this will delay the carrying out of the project is uncertain. Meanwhile, our French exchanges contain renewed complaints of the excessively foul condition of the Seine below the Paris sewers, a condition of things to which we can testify from our own observation.

We devote a page elsewhere to publishing in tabulated form the bids of the several contractors for the sections A and B of the new aqueduct of this city. It will be noticed that the bids range from \$1,614,945 the highest to \$869,044 the lowest. The bids, however, can hardly be called unbalanced bids, as they have been designated in a daily paper.

We have taken the trouble to give the engineers' estimates of quantities, and also to make the computations, giving totals. This has involved considerable labor, and the use of the space we have devoted to this matter. We trust it will prove valuable for reference, and of interest to engineers and contractors.

A PRESS of standing-matter compels us to hold over for another week some elaborate illustrations of interesting plumbing-work, in the residence of Mr. H. H. Cook, in this city. Likewise some special correspondence is held over, because we are obliged to go to press one day earlier, the office being closed on Election Day.

DWELLINGS FOR THE IRISH PEASANTRY.

IN August, 1883, the English Parliament passed a law intended to secure better dwellings to the agricultural laborers of Ireland. Power was given to the local sanitary authorities to obtain loans from the treasury, payable after long periods, with which to erect dwellings, but as the rent which the tenant can pay is not expected to equal the annual payments by which the local sanitary authority is obliged to gradually liquidate the loan, the difference would fall on the rate-payers, consequently but little zeal was manifested in carrying out the law, and it is said that not one cottage has yet been begun in the whole of Ireland. In general the Local Government Board has a supervision of the matter, but leaves the details chiefly to the local Irish Sanitary Authority. The Local Government Board, however, does require that plans for buildings constructed under the act shall conform to certain conditions which are stated by the *London Architect* as follows:

1. The number of rooms must be sufficient to provide for the due separation of the sexes, and there should be a kitchen and at least two bedrooms in every house.
2. Every habitable room should have a height of not less than eight feet throughout, except in the case of a room constructed in the roof, when one-half of the area of the room should have a clear height of seven feet.
3. Each habitable room should have one or more windows of a total area of glass of at least one-twelfth of the floor space, and all bedrooms should be floored with boards or tiles; the ground floor should be raised not less than nine inches above the level of the external ground.
4. A proper privy should be constructed, in each case separate from the dwelling-house, and distant at least ten feet therefrom; the floor should be flagged or otherwise rendered impervious, and raised at least four inches over the adjoining ground.

OUR BRITISH CORRESPONDENCE.

Brandy as a Fish Reviver—Thames Water—Shrimp-Poisoning at Margate—Plumbers' Congress—Typhoid Epidemic at Kidderminster—Cambridge Sewerage—Tunnel in the Island of Samos.

LONDON, October 18, 1884.

THE *Fish Culture Journal* records a singular experiment proving the truth of the assertion recently made by an American that brandy acts as an immediate means of revivifying fish on the point of expiration. The experiment was conducted by the Secretary of the National Fish Culture Association, at South Kensington, a few days since. Two Prussian carp were taken from the tank at the Aquarium, and allowed to remain out of water four hours. Then to one of them a small quantity of brandy and water was given by means of a feather, and both the fish again placed in the water. The carp to which brandy had been administered quickly revived, and appeared none the worse for its long absence from water; but the other, in a short time, seemed to be quite dead, and was taken out of the water and thrown aside. So far the experiment appeared pretty successful, but the operator was not content to rest here. He at once operated on the seeming inanimate fish by opening its mouth and pouring a dose of brandy and water down its throat, and again putting it in the water, when, to his astonishment, he noticed slight signs of animation. For five minutes the unfortunate object of the experiment floated helplessly on its side, when presently it gradually asserted itself in the water, and with considerable effort made use of its fins—feebly at first, but afterward energetically. Both the resuscitated fish, who show no signs of their late prostration, are now in the tanks as usual.

Dr. Frankland's report upon the quality of waters supplied to the metropolis by the various water companies during September, states that the Thames waters delivered were clear and bright, and contained a comparatively small portion of organic matter. The deep-well waters supplied by the Kent and Cohn Valley Companies and by the Tottenham Local Board were of their usual excellent quality.

The Medical Officer of Health for Margate has just issued his report on the recent case of shrimp-poisoning at that place. It appears that the shrimps were caught by a man on the sands in the immediate neighborhood, and that he boiled the shrimps in a saucepan in which he had boiled his dinner the day previous. The Medical Officer's conclusions are that the shrimps when caught were wholesome, and that it is probable they became injurious during the process of boiling, through some deleterious matter being either present in the pot or having been accidentally introduced therein. While on this subject, I notice that a meeting of the Preserved Food Trades' Section of the London Chamber of Commerce was held at the offices last Tuesday, when the attention of the committee was called to the various reprehensible practices employed, both in London and elsewhere, of selling tinned meats of inferior and unwholesome quality, marked either with spurious labels imitating those of well-known firms. To counteract this evil a vigilance committee was nominated to follow up suspicious cases and report them to the section.

The Plumbers' Congress alluded to in my letter of the 4th inst. will be held at the Technical Institute, South Kensington, on Monday next, the 20th inst., under the Presidency of Mr. George Shaw, Master of the Plumbers' Company.

The typhoid epidemic at Kidderminster, though abating, has not entirely died out yet, and Dr. Parsons, acting under the instructions of the Local Government Board, has commenced a house-to-house visitation of the numerous residences where the typhoid fever exists. There is a strong desire for a public inquiry, and Dr. Parsons has been addressed on the subject by the inhabitants.

The people at Cambridge have not yet decided as to what to do with their sewage. Some time ago Sir J. Bazalgette propounded a scheme to divert the sewage from the Cam, into which it now flows, and lately another plan has been put forward by Mr. Bullock—viz., to construct an intercepting sewer by tunneling through the gault. The Commissioners of Sewers at Cambridge have agreed to institute a series of borings to ascertain whether a stratum of gault exists, as asserted by Mr. Bullock. Notwithstanding the unsatisfactory state of the drainage of this district, the death-rate for the last quarter, ending September 29 was only 17 per 1,000.

According to this week's *Nature*, a tunnel measuring about 5,000 feet in length has been discovered by the Governor of the Island of Samos. No doubt this is the tunnel mentioned by Herodotus, and was constructed at least nine centuries before the Christian era, serving the purpose of providing the old sea-port with drinking-water. *Nature* states the tunnel is completely preserved, and contains water-tubes of about twenty-five centimetres in diameter, each one provided with a lateral aperture for cleansing purposes. The tunnel is not quite straight, being slightly bent in the middle.

SAFETY-VALVE.

HEATING AND VENTILATION OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

No. II.

(Continued from page 508.)

THE air is warmed to 60° Fah. immediately after passing through the inlet-windows, and is further heated as required for the various rooms by means of coils at the base of the flues. The heating-surface is in two parts: a main coil at the entrance, and the supplementary coils at the flue-bottoms.

There are several reasons for this division, principal among which is the protection of water and other pipes in the sub-basement from frost; and for the warmth of the basement proper the air in the sub-basement must be warmed to 60°, or thereabout. This air cannot be advantageously warmed above 60°, as some of the rooms frequently require a flue-temperature little, if any, above 60°. The supplementary coils are needed, since the various rooms require different flue-temperatures. They are placed in the sub-basement, because of compactness, and to prevent damage by leakage, but more particularly to place the valve manipulation in the hands of the engineer.

The main heating-coil is made up of eleven sections, such as are shown in Fig. 4, each section containing fifty 1-inch pipes of twelve feet length, the sections standing vertically, side by side, forming a wall 12' x 22' = 264 square feet area. Each of the sections is made up of ten sub-sections, so put together that in case of accident to any single pipe the sub-section to which the damaged pipe belongs may be removed for repairs.

The coil contains about 7,500 lineal feet of pipe, and the free area for air-passage through it is about 120 square feet. The regulation of temperature and steam-pressure within the coil is by means of a reducing-valve, set at any fixed point less than boiler-pressure, and by shutting off one or more of the coils, or by the "by-pass" over the coils.

The condensed water from ten of the coil-sections is made to pass through two Nason traps, yoked abreast, and then through the eleventh coil-section for cooling the water before being returned to the boiler-tank.

The supplementary heaters are of the same general character as the main coil, being made up of pipes widely spaced to allow free air-movement, the heating-surface in each coil depending on the flue-temperature required, which for any room varies inversely as the ratio of its air-supply to its capacity. The total length of piping in these coils is about 14,000 feet.

The placing of seventy-six of these coils, distributed along 700 feet of wall containing the flues, and over an area of some 12,000 square feet, was made difficult, because (1) of the small working room between the two planes containing the supply and the return pipes, both of which are beneath the boiler level, and (2) the desirability of controlling each coil-temperature by a single valve.

The valve used is the "Tudor" fractional-valve, which seems equal to the requirements. The theory of this valve's action, as applied to this system, is based on the fact that a given coil-surface will in a fixed air temperature and current condense a fixed amount of steam at a uniform pressure.

The "fractional-valve" is shown in Fig. 5. It admits of but three-fourths of a revolution of the valve-stem to open it to its fullest capacity. The valve is adjusted to any sized coil within the limit of its capacity by means of a sleeve, which fits closely over the valve and its seat. At the bottom of the sleeve are inverted V-shaped slots. If the sleeve is slipped down so that the valve-seat is within the entire part of the sleeve, no steam can escape through the valve, except by leakage. If the sleeve is raised so that the valve-seat falls within its notched part, the amount of steam escaping will depend on the ratio between the closed and the free spaces.

The conditions required for the successful operation of this valve are found in the sub-basement of the new building,

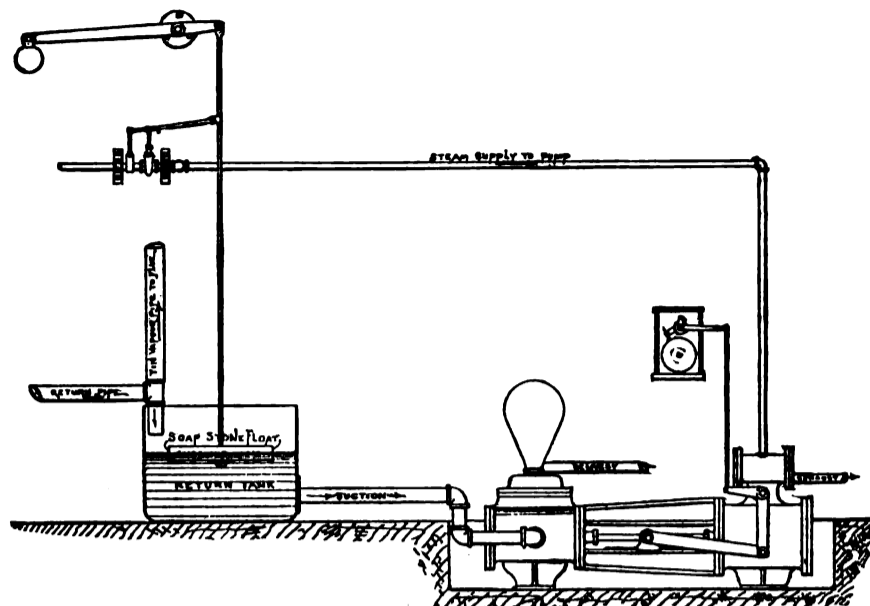


FIGURE 7.

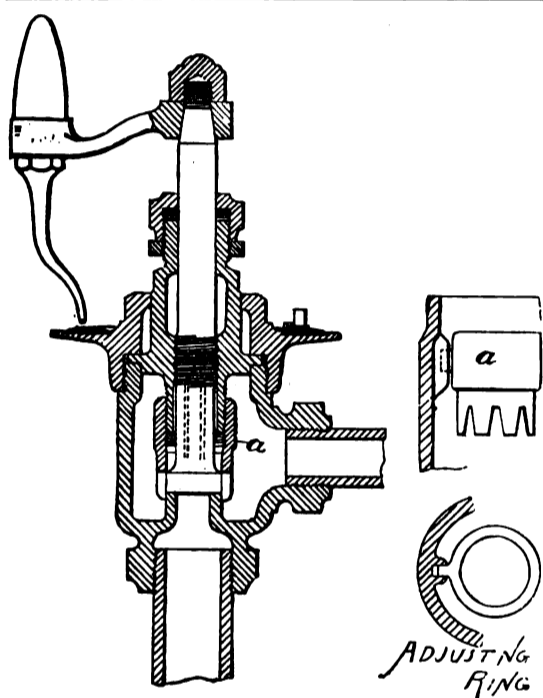


FIG. 5.

where the temperature is maintained as nearly as possible at 60°, and the air-current is very nearly constant. The seventy-six coils drain into open pipes which deliver the water into a small open tank, from which it is pumped to the boiler-tank. The steam-pressure in the main is limited to ten pounds, as the exhaust from the engine running the fan is ordinarily used in heating the supplementary coils, and the engine-valves are set to run against a back-pressure not exceeding that amount.

If it is desired to raise or lower the temperature of all the seventy-six supplementary coils together, it may be done by varying the steam-supply pressure, which, by means of a reducing-valve, may be steadily maintained at any point within the limit of ten pounds.

For convenience of manipulation the valve-stems are passed up through the basement floor, and terminate in a slotted head, and are turned by a key. A number on the ceiling above the valve-stems indicates the room whose air-supply the coil affects.

Fig. 6 is a horizontal section of the building showing inlet-windows, main-coil, fan, sub-basement, supplementary coils, and flues.

The boilers and engine running the fan are in the "Rogers Building," the former at a point about 150 feet from the centre of steam-distribution in the new building. The supply (three inches diameter), the engine exhaust (four inches diameter), the return-pipes (one and one-half inches diameter), and the driving-shaft of the fan, run through a tunnel connecting the sub-basements of the two buildings.

As the boilers supply steam for other uses than heating the new building, it was determined to measure and make a daily record of the volume of water condensed in the heating-coils. As all the water of condensation passes through a Davidson pump, the pump is made to answer the

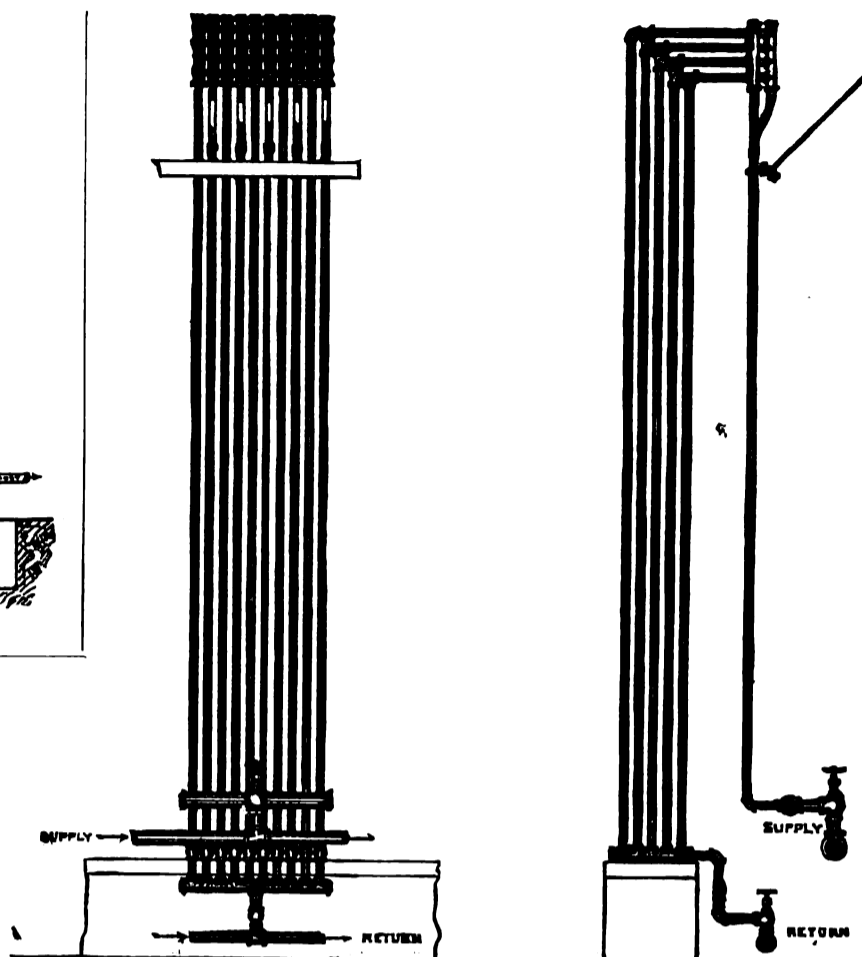


FIGURE 4.

purpose of a meter. The diameter of the cylinder and the length of stroke being known, the strokes of the pump are registered. For this purpose an apparatus for recording the hourly rate as well as daily aggregate amount of condensation was devised. This is shown in Fig. 7. The condensed water is received into the tank from which it is withdrawn by the pump. A counterpoised soapstone-float regulates the pump's steam-supply, so that the pump shall cease action when the water-level in the tank falls below a certain point, and shall begin when it rises above that point. Thus the pump is prevented from pumping air, except as the steam-valve may leak, or the float, through some obstruction, fail to act. If the pump fails to make a full stroke, or if there is leakage about the piston, or should air be pumped, each stroke is recorded as full, and as moving a corresponding body of water. Thus all the odds are taken by the recorder, and every advantage given the fireman, who might make cause against the costliness of the ventilation of this building.

To Mr. Kenway, one of Mr. Frederic Tudor's employees, the credit of devising the measuring and recording apparatus is due.

Each movement of the piston-rod actuates a system of levers or connecting pieces, moving a ratchet-wheel through one-eighth of a revolution. The ratchet-wheel carries a screw of one-twentieth of an inch "pitch," and on the screw rides a nut with pencil attached. Under the pencil is a cylindrical drum four inches in diameter and ten inches in length, which is rotated by clock-work once every twenty-four hours. A paper wrapped upon this drum has hour-lines parallel with the drum's axis, and at right-angles to its axis, other equidistant lines corresponding to each 100 cubic feet of water passed through the pump, ten revolutions of the ratchet-wheel corresponding to 100 cubic feet of water moved. The pencil, moved by the screw in a line parallel with the axis of the drum, makes with the rotation of the drum a diagonal line such as appears in Fig. 8, which departs more widely from the parallel of lines of equal volume as the rapidity of pumping is increased.

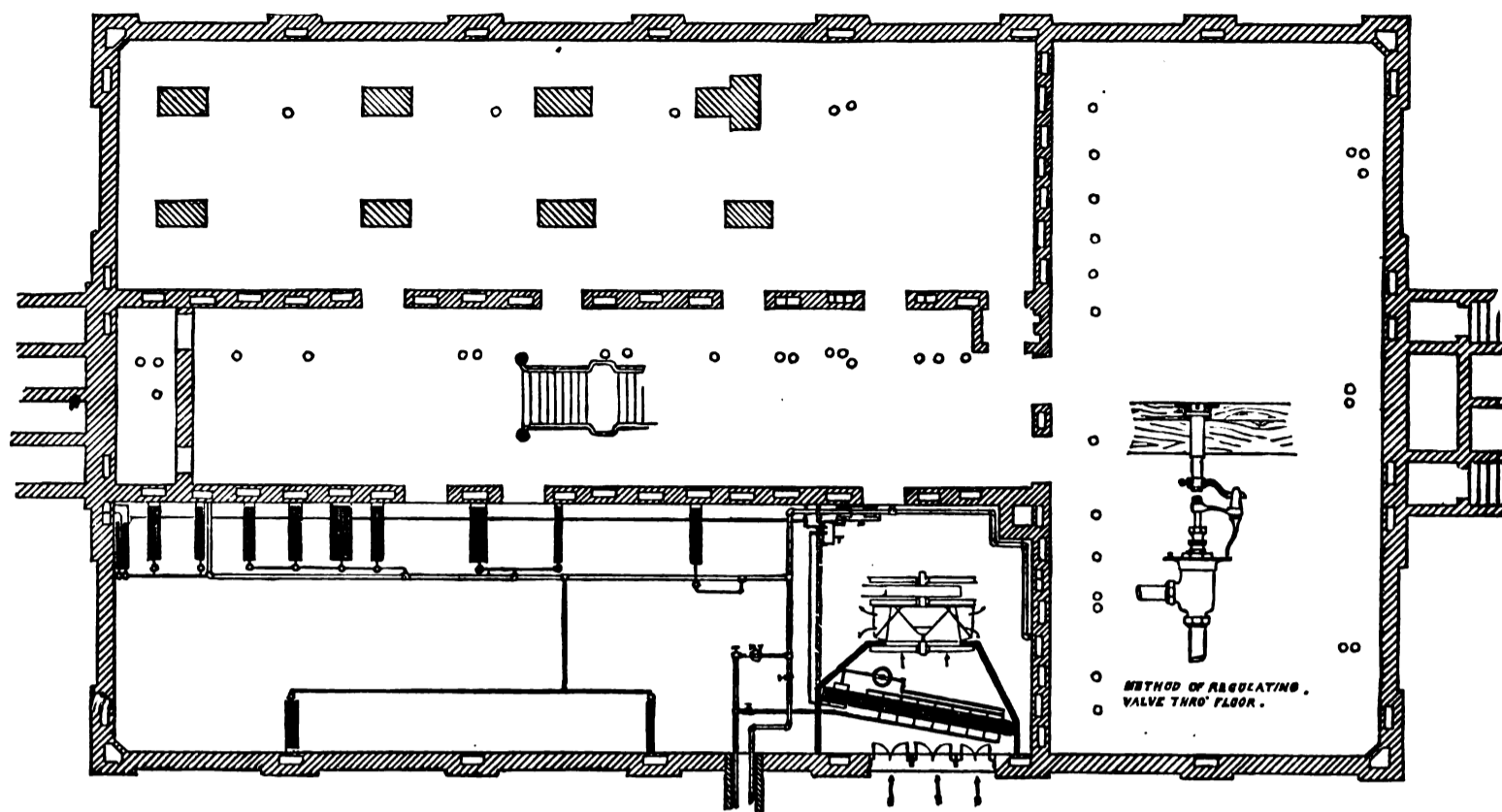
The record lines shown are two obtained on the days whose dates are given, that of February 29 being the record for the coldest day of the season, and the other the record of a much warmer day. The line shows the sudden condensation following the admission of steam into cold pipes, the increased condensation when the cold-air windows are opened and the fan is started, the diminished rate of condensation as the day advances and the outside temperature rises, and also the effect of opening or shutting off steam sections. It is intended also to show the time at which

steam is let into the coils and when shut off, and when the cold-air windows are opened and the fan started, betraying any failure of fireman or engineer to follow given orders. Tampering with the recording of the instrument is open to easy detection, the continuous and uniform character of the line being such that any manipulation must be apparent. The usefulness of this recorder in the one matter of detecting waste of fuel due to inefficient boilers or faulty stoking appears in the fact that the indicated condensation for the six months (November-April) was 99,360 cubic feet, or at 150° Fah. 5,961,600 pounds. As ten pounds water (at 150° Fah.) may be evaporated per pound of coal (anthracite), 298 tons appear as the necessary amount for heating and ventilation through a winter whose mean temperature is 34°. The actual consumption for that purpose during the past winter has been about 550 tons. (A reconstruction of the boiler-furnaces is under consideration.)

The movement of large masses of air through the building makes it necessary to elevate the mean flue-temperature but little above the desired mean room-temperature of 65° to compensate for cooling through the walls and window-surfaces. The area of brick-surface is approximately 23,000 square feet and of window 12,000. The thinness of wall, averaging practically eighteen inches, and the large window-area, make it necessary to add to the mean flue-temperature nearly one-half the heat required to elevate the temperature to 65°; that is, for every cubic foot of water condensed to raise the air to 65°, one-half cubic foot more must be condensed to compensate for loss through walls and windows, and for the water-evaporation, to be spoken of later.

In Fig. 9 let the line O X represent outside temperatures, ranging from 10° to 65°, and the line O Y the various elevations of temperature required.

The dotted line represents the elevation in temperature above that outside, if the flue temperatures are maintained at 65°, and the continuous line the elevation theoretically required. The temperature increment must vary with conditions of weather, such as force and direction of wind, cloudiness, humidity, and also with the air-volume passed into the building. As one cubic foot of water condensed from steam at 212° to water at 150° will raise the air-supply of 3,500,000 cubic feet of air one degree, the continuous line also represents the cubic feet of condensation for corresponding outside temperatures. Thus, with an outside temperature of 40°, 37½ cubic feet of water will be condensed per hour. The circled points show the actual condensation for certain days, taken at random from the record. The group furthest above the line belongs to



PLAN OF BASEMENT - PART OF FLOORING
REMOVED TO SHOW SUPPLEMENTARY COILS.

FIGURE 6.

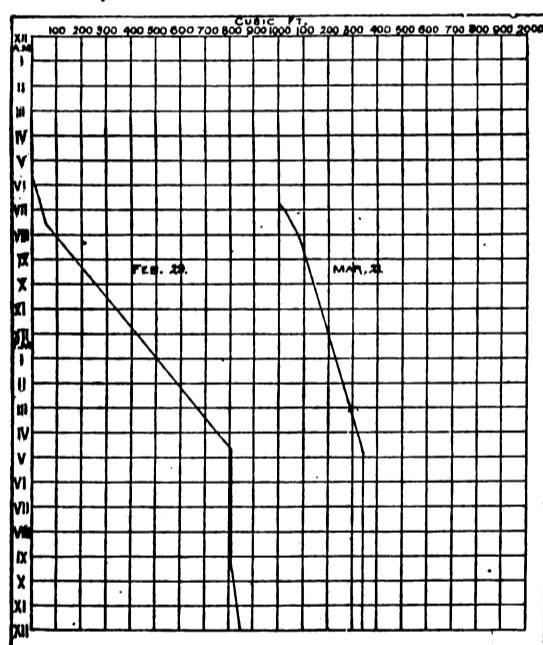


FIG. 8.

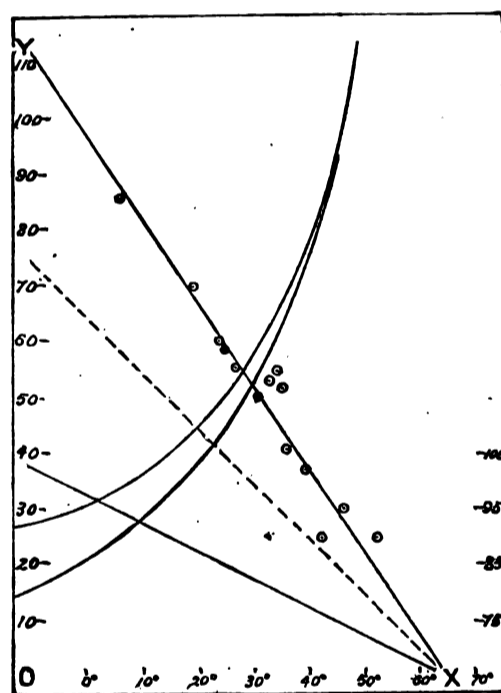


FIG. 9.

Mondays, the building becoming chilled through the forty-eight hours between Saturday night and Monday morning. The one point falling far below the line is for a day following a boiler test, when the waste steam, passing through the coils all night, had overheated the building. The curved lines show the volume of air which the present boiler capacity can heat to the required temperature, aside from other demands upon them. The upper curve is constructed without and the lower with regard to loss of heat by evaporation.

Humidity is imparted to the air passed through the flues by means of the large and moist concrete sub-basement floor over which it must move before reaching the flues. The amount evaporated is regulated automatically by the relative humidity of the air admitted. If that is warm and moist nothing is added to it; if cold and dry, a considerable quantity of water is taken up. A measurement made when the outside temperature was 10° Fah., and relative humidity 65°, made the inside relative humidity 35°, with temperature 65°, showing that some 800 pounds of water were being evaporated, per hour, raising the humidity some ten per cent. higher than without any evaporation. It is desired that for temperature 65° the humidity should

be kept below rather than above 40°, as a higher humidity so hastens organic decomposition that in a full room there comes, after a time, a sense of closeness and a trace of the odor peculiar to crowded rooms; whereas, in another room under identical conditions, excepting a lower humidity, the air remains sweet and invigorating. With the low basis of 1,500 cubic feet to the hour, choice must be taken between moderately dry and sweet air or moisture, with accompanying foul odors.

Nature's conditions of temperature and humidity in Boston can be followed where nature's air-volumes are employed, but when those volumes are reduced to 100 or 1000 part, the reduction of humidity to one-half is not unreasonable.

Carbonic-acid tests have been made under the direction of Prof. Nichols, which show for his lecture-room, No. 35, after a class of eighty or ninety had occupied it for an hour:

February 29.....	4.3	Volumes in 10,000.
March 1.....	3.3	"
" 3.....	7.8	"
" 5.....	6.1	"
" 11.....	4.5	"

This room has but two-thirds the schedule outlet area, and one-half of that is often closed, which may account for

the comparatively high proportion of CO₂ found in two of the list. Room 38, after consecutive classes of thirty had occupied it for two or three hours, gave 10000 CO₂. If the individual CO₂ elimination is 75 cubic feet per hour, and the air-supply is 1,500 cubic feet, when sixty students occupy the room five parts of CO₂ would appear in addition to the three or four found in normal atmosphere; thirty occupants should therefore raise the three or four to 5.50, 6.50 parts in 10,000. The ventilating action of the current within the room would therefore appear efficient if the sample were taken from the air entering the outlet.

Another feature of the heating system is the large warmed wall-surface resulting from the use of the hollow wall for flues. That warmth so compensates for the chilling effect of the exceptionally large window-area, that a much lower air-temperature is comfortable than would otherwise be tolerable.

The use of registers is not in accordance with original plans, which proposed large areas covered with fine wire cloth.

A serious, because inherent, defect in the system is that which pertains to most methods of indirect heating, the difficulty of controlling the movement of small volumes of admitted air. Thus, when the sub-basement is tight closed, as at night, the long warm flues, being the strongest, produce an air movement to the top stories, and the supply for that movement for the most part enters by the walls and windows of the lower stories and passes down the shorter and chilled flues to the plenum. The colder the weather and the warmer the plenum, the more active the operation and the more chilled the lower rooms become.

The remedy is in a freer air-supply through open cold-air windows, and by closing the dampers of the long heated flues. Another difficulty is experienced in cold weather in the quick cooling of rooms, when the fan has stopped running, since there is not that accumulation of heat in the upper part of the air and walls, and the ceiling of the room found where warming is done with highly heated air, and which serves as a reservoir of warmth for some time after the supply is cut off. The difference of temperature between the ceiling and the floor in the room whose air-supply is most highly heated is but 4° with an external temperature of 25°. The chilling of the lower floors is also hastened by the reversed action of their flues, when the air-supply is cut off as explained in the preceding paragraph.

The general result of the system's operation are accepted by those occupying the building as exceptionally good, and the opportunity which its detailed character affords for study and experiment, will, it is hoped, lead to investigations of a fruitful order.

Mr. Frederic Tudor, of New York, devised and constructed the steam system by which the air is heated, the entire work being executed under the supervision of Mr. Woodbridge, who planned the building's ventilation.

DANGEROUS BLUNDERS IN PLUMBING.

No. II.

(Continued from page 505.)

FIGURE 3 of our article printed last week showed a case occurring in New York, where a part of the air-supply for the furnace was derived from the sewer. The first illustration of this article shows how a similar dangerous condition was produced in a Philadelphia house by a somewhat different combination of causes. A tile-drain below the cellar floor was broken and had imperfect joints. Then into this drain was brought a galvanized-iron rain-leader from an extension. The joint where the leader entered a hub on the drain was imperfect; the leader itself was not tight, and was carried down between the wall and the studding, so that any foul air which passed into the leader from the drain found exit into the space behind the studding, and

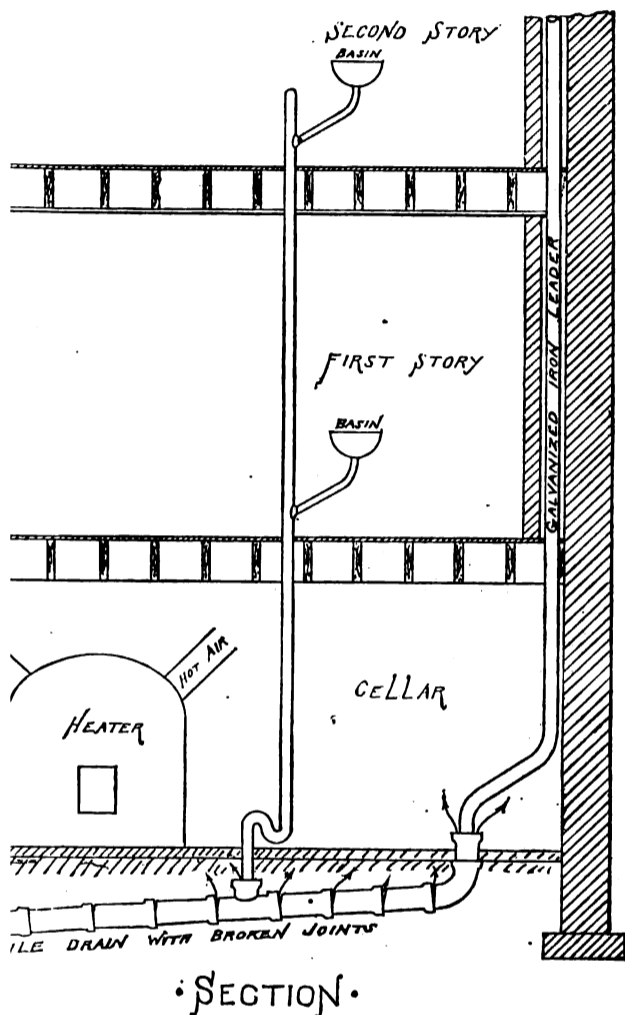


FIG. 1.

without much difficulty entered the house. At the same time the foul air of the drain was drawn from the imperfect joints and cracks into the heater as a part of its air-supply, and so sent over the house. Another clumsy feature about this job was the connecting of two wash-basins on upper floors with their waste-pipe without traps. The only trap between the basins and the drain was placed near the foot of the waste-pipe. Such an arrangement, of course, gave free access into the room of any smells from a long and dirty stretch of pipe, extending from the highest basin to the cellar, and having no trap to cut it off from the house.

In attempting to secure the ventilation of a water-closet room an economically-inclined workman produced the condition shown in Fig. 2. The soil-pipe running up above the roof with open end, it was plainly inferred that if the room was connected with it the room itself would be ventilated by reason of an up-draft, which was supposed to always exist in the soil-pipe. Accordingly a ventilating opening was made in the ceiling of the water-closet room, and a ventilating connection put between this opening and the soil-pipe. The result was, of course, that very often the currents of air in the soil-pipe were downward, and its foul air and smells passed into the room.

Figure 3 may be taken as a type of what has unfortunately been a common error. It is undoubtedly a good thing to ventilate the containers of pan-closets, if that is properly done, and that form of closet is used, but the container must then be connected with an independent flue or a pipe having no connection with the drainage-system.

Nevertheless, so-called plumbers take the "short-cut" method, and connect the container with the soil-pipe direct, or with the trap-ventilating pipe, which is equally bad, and

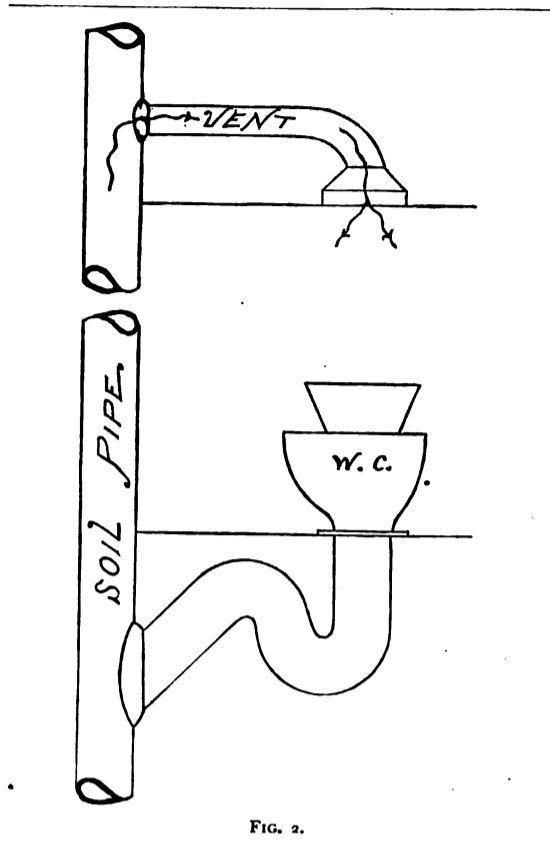


FIG. 2.

so, of course, do away with the protection afforded by the trap of the water-closet; for the container vent-pipe offers a direct path for the soil-pipe air into the container, and there is no efficient protection to prevent its passage from the container into the house. This is the case with the

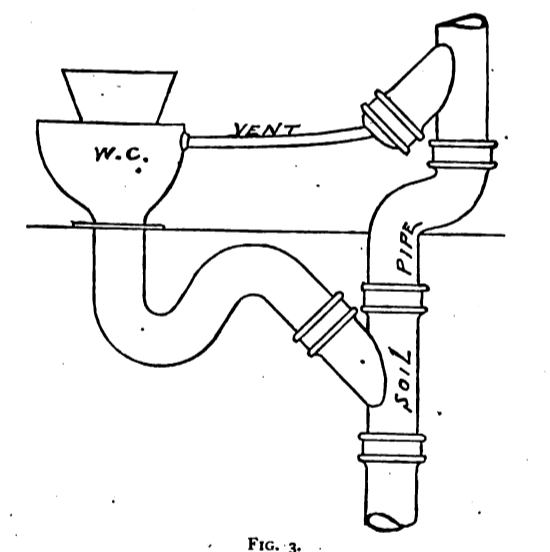


FIG. 3.

work shown in the cut, where, it will be seen, a vent-pipe from the container of the water-closet connects directly with the soil-pipe.

Figure 4 contains its own explanation so clearly on its face that explanation is hardly necessary. One of the tubs

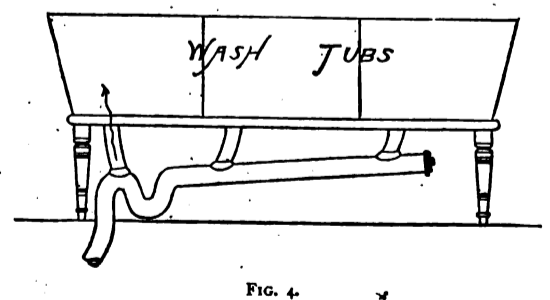


FIG. 4.

of a set of wash-trays was connected into the top of the trap, which was common to all three. Of course, such a connection being outside of the trap-seal, an open course was provided for the bad air from the drains into the kitchen by way of this tub.

TO BE CONTINUED

AMERICAN PUBLIC HEALTH ASSOCIATION.

No. III.

(Continued from page 510.)
(From Our Special Correspondent.)

SECOND DAY.

THE association was called to order by President Gihon promptly at half-past nine o'clock, and after the election of a goodly list of new members, proceeded with the programme for the day.

Dr. Homan, from the Committee on Compulsory Vaccination, reported that owing to the complete report of last year the committee would not make any additional report.

Dr. Gihon then read a paper written by Dr. Stephen O. Richey, of Washington, entitled "The Hygiene of Eyesight of School Children."

The report of the Committee on School Hygiene next followed, Prof. D. A. Sargeant, of Harvard University, being the author. Circulars should be sent to the school teachers throughout the country, to obtain information on the subject of school hygiene. The report was accepted, and the committee increase to seven was allowed to stand.

"Cotton-Seed Oil as Food," by Prof. Charles E. Monroe, of United States Naval Academy, Annapolis, Md., was read by Rev. John D. Beuglass, Chaplain U. S. Navy, in the absence of its author.

An elaborate and interesting paper on "School Hygiene," by Dr. Felix Fromento, of New Orleans, was next read. This was followed by a carefully-prepared paper, entitled "The Sanitary Survey of the School-Houses of Indiana," by Dr. E. S. Elder, Secretary of the Board of Health of that State.

Dr. Raymond, of Brooklyn, opened the informal discussion of these papers. He said too much attention was paid to the public and too little to the private schools. One trouble is that private dwellings are often used as schools, and contagious diseases arising in the family are suppressed because the publication of the matter would close the schools. The same danger exists in public schools where janitors live in the building. A rule ought to be made prohibiting any person from living in the buildings used as schools. No child in Brooklyn, recovered from any contagious disease, is allowed to return to school without a health permit from the proper sanitary officer.

Hon. Erastus Brooks, of New York, said sanitary education was just as important as mental education. Seven millions of children attend the schools of our thirty-eight States and Territories, and 224,000 teachers, irrespective of private schools. In New York there are 11,000 school districts, and the same number of schools, and a much larger number of teachers. Nothing could, therefore, be of more importance than a discussion of school matters. The state of affairs in Indiana is perhaps no worse than that in other States; four years ago some schools in New York were fully as bad as those in Indiana. One trouble is that school commissioners are very commonly politicians.

The following gentlemen also took part in the discussion: Dr. Thompson, of Kentucky; Dr. Reed, of Ohio; Dr. Gihon, the President; Dr. J. H. Bryce, of Toronto; Dr. A. N. Bell, of Brooklyn; Dr. Lyndon A. Smith, of the Bureau of Education, Washington; Dr. G. P. Conn, of New Hampshire; Dr. William Bailey, of Kentucky; Dr. Early, of Indiana; Dr. Fee, of Kansas City, Mo.; Dr. Devron, of New Orleans; Dr. Green, of Pennsylvania, and Dr. Hibbard, of Indiana.

The next paper read was by Prof. V. C. Vaughan, of Michigan, on a "Study of Poisonous Cheese." He said that it is well known that cases of severe illness follow the eating of some cheese, especially in North Germany and America, but in France no such cases are found. In Michigan, within the last six months, over 300 cases of cheese-poisoning have been reported. The symptoms produced are dryness of throat, nausea, vomiting, diarrhoea, headache, and double vision. No cases of fatal cheese-poisoning have occurred in Michigan, but in Holland, out of 343 cases which occurred in 1874, six were fatal. Prof. Vaughan found that in every case the poisonous cheese gave an intensely acid reaction when tested with litmus paper, and is of the opinion that the poisonous principle may be butyric-acid developed by the growth of bacillus subtilis, which was found in association with other micro-organisms in the acid-fluid contained in cavities in the cheese examined.

"The Milk-Supply of Large Cities," by J. Cheston Harris, of Philadelphia, was next read.

Dr. George M. Sternberg, U. S. Army, opened the informal discussion by approving the conclusions of Prof. Vaughan on the poisonous-cheese question.

Dr. B. F. Davenport, Milk Inspector of Boston, related the difficulties experienced by the authorities in that city in combating the sale of skim-milk for whole milk.

Dr. S. W. Abbott, Boston, recounted the twenty-five cases of cheese-poisoning reported in Boston, and said that he was happy that a simple means of detection had at last been found. The symptoms in the case were almost identical with those of cholera-morbus.

Dr. J. H. Raymond, of Brooklyn, said he had met with two cases of cheese-poisoning, and thought Dr. Vaughan's test a good one. He thought there were other causes at work in affecting infant mortality besides impure milk, varying temperature being among them. The dealers, and not the middlemen alone, were responsible for adulterations.

Dr. Reed, of Ohio, found that the cases of cheese-poisoning in his State were similar to those of persons sick from eating fermented fruit. The poisoned cheese was overfermented, and not pressed dry, and the speaker was not satisfied that bacteria are the cause of the poisoning. Fermentation, he thought, was at the bottom of the trouble.

Dr. Newton, of Paterson, N. J., gave a very interesting recital of the efforts of the health inspections in his own State to secure good milk.

Dr. Comstock, of St. Louis, concluded the debate.

EVENING SESSION.

The evening session was called to order at a quarter after eight, with a good attendance of members and their ladies. The first paper read was that of Hon. Erastus Brooks, of the State Board of Health of New York, second vice-president of the association, entitled "That Food we Eat and the Adulteration to which we Submit."

Surgeon Walter Wyman, of the Marine Hospital Service, followed with an interesting paper, entitled "The Hygiene of Sailors engaged in the Coasting Trade, and especially the Hardships of the Chesapeake Oystermen."

This was followed by a paper on "Cremation as a Safeguard Against Epidemics," by Rev. John D. Beuglass, Chaplain U. S. Navy.

This was a well-written paper, and a strong argument in favor of cremation as a sanitary measure. The writer claimed that cremation is the only efficient way of disposing of disease germs. He said: "Pope Clement V. escaped contagion by building a wall of fire around his palace. Thirty-three per cent. of our deaths are caused by zymotic diseases, which can be obviated only by cremation. Instead, then, of laying our beloved dead into the cold bosom of earth, let us incinerate them, and thus return them to the original ashes from which they rose. Potters' fields are a disgrace to civilization and a pest to the community. Let crematories be established in connection with all public institutions, and let this influential body memorialize Congress for this purpose. But this is not enough. All garbage, all sewerage of the cities should be cremated, and thus will our land become the land of the living, and not the valley of the shadow of death."

A brief abstract from a paper entitled "The Ultimate Sanitation by Fire," by Hon. J. M. Keating, Memphis, editor of the *Appeal*, was read by Dr. J. B. Lindsley. All methods of disposing of sewage-matter in vogue at present are failures. All the great buildings in London for disposal of refuse of the Thames are far less useful than a simple crematory. The effect of sanitation by fire would prevent return of deleterious matter, as is at present the case; would increase the water-supply; would put a stop to soil-saturation and sewer-gas; would reduce scavenging to minimum expense, and obviate great systems of sewerage; put a stop to all nuisances complained of from defective plumbing; would prevent filling up of harbors with excretal matters; would prevent a wholesale destruction of fish, the poor man's free food; it would put a stop to the cesspool system in villages, hamlets, towns, and cities; it would solve all problems that now vex sanitarians from house-connections, by which the sewage finds its way to rivers and harbors; it makes a finality of all wastes of cities.

The subject of cremation was discussed by Dr. John Morris, of Baltimore; Dr. Felix Fromento, of New Orleans; Dr. George M. Sternberg, U. S. Army; Dr. A. C. Bernays, of St. Louis; Dr. J. H. Raymond, of Brooklyn, and Prof. G. H. Rohé, of Baltimore.

THIRD DAY.

The association met promptly at half-past nine o'clock on Thursday morning, and after some preliminary busi-

ness proceeded with the reading of papers on the programme for the day.

A paper was read by Dr. W. B. Conery, of the State Board of Health of Missouri, and related to "The Sanitary Care of Stock in Transportation."

Dr. J. M. Partridge, of Indiana, then submitted the report of the Committee on Cattle Disease, and Dr. A. N. Bell, of Brooklyn, that of the Committee on Epidemics.

Dr. Joseph Holt, of New Orleans, read an extremely interesting paper upon "Quarantine Sanitation," in which he vigorously assailed the old-fashioned "time quarantine," and explained at length the system which under his direction has been adopted in New Orleans. This is based upon modern and approved methods of disinfection of vessel and cargo and of the personal effects of passengers and crew. The agents chiefly relied upon are sulphurous-acid gas as a volatile disinfectant, and a solution of the bichloride of mercury (one part to 1,000 of water) for washing surfaces and clothing. Dr. Holt was much pleased with the bichloride solution, which was an economical disinfectant in the proportion used, and had been demonstrated to be an efficient germicide in this proportion. Diagrams were exhibited and explained illustrating the apparatus in use at the New Orleans Quarantine Station, by which sulphurous-acid gas in any amount required may be introduced into a vessel. The method had been found very satisfactory.

Dr. G. B. Thornton, of the State Board of Health of Tennessee, then read an interesting paper upon "The Sanitation of the Mississippi Valley." This was followed by a paper upon "The Present and Future of Water-Supply," by Dr. Charles Smart, U. S. A.

Dr. Smart said that it is not the dead organic matter which makes our water dangerous, but the living organisms. They are connected with vegetable decomposition and sewage. The living organisms should become the object of persevering study, and their presence should be carefully tested for. The microscope and culture experiments offer the best solution of the question of a good water-supply.

Dr. James E. Reeves, Secretary of the State Board of Health of West Virginia, read a paper entitled "The Pollution of the Upper Ohio and the Water-Supply of its Cities and Towns." The condition of health and probable duration of life of a people may be correctly measured by the quality and quantity of their water-supply. There are two cities at the head of the Ohio—Allegheny and Pittsburgh—whose aggregate population is not less than 240,000. Besides refuse of all kinds, the Ohio is made the convenient receptacle for the carcasses of diseased animals, and thousands of tons of corrupting matter are daily thrown into the stream which supplies the water we drink. No wonder, then, that diarrhoeas and typhoid fever are so common and the death-rate from these diseases is so high. Generally speaking, waters that are free from the actively moving ciliated infusoria, and that present a comparatively dead microscopic field, are waters that have percolated through a very pure or a very impure soil. In other words, they are very pure spring or very foul well waters. Waters containing nitrates are regarded by Franklin, and Elkin of London, as dangerous, even when containing a small proportion of these salts, and water containing nitrates is particularly to be avoided. It is not the ordinary organic matters of decaying garbage, animal fragments, etc., that are dangerous when taken into the system, but certain morbid micro-organisms which may accompany them.

"The Relation of Depth of Water in Wells to the Causation of Typhoid Fever," by Dr. Henry Baker, Secretary of the State Board of Health of Michigan, was next read. The author showed that deaths from typhoid fever were dependent in many cases upon the low state of the water in wells, and occur in very warm and very cold weather. The temperature of well-water has some slight effect upon health. In 1881, in Michigan, when typhoid fever raged, the stage of water in the wells of the State was exceptionally low. The question arises, is there a quantitative ratio between the two observed phenomena? From all obtainable evidence it would appear that in Michigan at least there is not the same relation of fever and levels in winter and summer. What constituent of drinking-water causes typhoid fever? Bacteria cannot exist in fresh well-water, and the serous evacuations in cases of severe diarrhoea are probably the direct cause of typhoid fever, and in Michigan the fever increases every autumn immediately after periods when diarrhoea prevails extensively. A specific cause of outbreaks of fever has been determined by investigations of eminent microscopists who have cultivated the typhoid bacillus. How does typhoid fever depend upon low water in wells? A study of the relation of closets and wells will

reveal the cause, for whenever the level of the water in the well is below that of the fluid in the closet there is a tendency of the latter to flow down into the well or into the waters near the well. The dilution of the poisons when the waters in wells are high explains the decrease of typhoid fever during those periods. How can typhoid fever be prevented? The answer is in four words: Stop drinking contaminated water. To prevent contamination of well-water is a much more difficult problem, and vegetable contamination must be avoided as well as animal contamination.

"The True Value of Chemical Analysis in Determining the Hygienic Purity of Potable Water," was read by Thad M. Stevens, M. D., of Indianapolis, Ind. It was an interesting treatise of the most successful modes of chemical analysis.

"The Manufacture of Soda-Water from Polluted Well-Water," by Dr. Frank R. Fry, St. Louis Medical College, was next read. Most of the manufacturers of fountain soda-water in this city use well-water. All of the wells from Chouteau to Cass Avenue, and from the river to Fourteenth Street are contaminated by sewage. There is great difficulty in contending with this practice, owing to the fact that, although impurities have been discovered in the wells, a sufficient amount has not been found to justify the Board of Health in taking legal action and in condemning and in destroying the well. The most profitable plan would be, of course, to destroy and close up the wells, but the proprietors cannot see it in this light and fiercely resist the officers. It would therefore be of the utmost avail if this society would stamp its approval upon the condemnation of the use of well-water in soda manufacture. Especially so, as the probability is that a similar state of affairs exists in other cities of the Union.

Dr. S. S. Herrick, Secretary of the State Board of Health of Louisiana, then read a valuable paper upon "The Relation between Underground Sewerage and Filth Diseases."

A paper on "The Chemical Disposition of Sewage" was read by Dr. W. J. Harris, of St. Louis, and the following papers, in the absence of their authors, were read by title: "The Disposal of Sewage by Chemical Action and Subsoil Irrigation," by George N. Bell, C. E., of Newport, R. I.; on "The Disposal of Sewage," by Col. George E. Waring, C. E., of Newport, R. I., Secretary of the National Board of Health.

The following gentlemen took part in the discussion of the papers read: Dr. E. M. Hunt, Trenton, N. J.; Dr. Harris, St. Louis; Dr. J. H. Raymond, Brooklyn; Dr. P. H. Bryce, Ontario; Dr. H. J. Herrick, Cleveland; Prof. Vaughan, Ann Arbor, Mich.; Dr. Fee, Kansas City; Dr. Robert Moore, St. Louis, and others.

During the morning session the liberal offer of Mr. Henry Lomb, of Rochester, N. Y., was announced to the association. This gentleman, feeling especially interested in the welfare of the laboring classes and of their children in the public schools, offers four prizes of \$500 each for the best essays upon the following subjects:

First.—"Healthy Homes and Food for the Working Classes."

Second.—"On the Sanitary Conditions and Necessities of School-Houses and School-Life."

Third.—"On Disinfectants and Individual Prophylaxis Against Infectious Diseases."

Fourth.—"On Appliances and Means for Saving Life and for Protection against the Injurious Influences of Some Work and of Certain Occupations upon Health."

These prizes are open to universal competition, and will be awarded by four independent committees consisting of five members each. The American Public Health Association is to appoint three members of each committee, the National Board of Health one member, and the President of the Conference of State Boards of Health one member.

The competing essays under the third heading (on disinfectants, etc.), must be ready by the first of April next. This provision is made by Mr. Lomb in view of the possibility of an epidemic of cholera next year. The other essays must be placed in the hands of the several committees before the next annual meeting of the Public Health Association.

EVENING SESSION.

The evening session was opened by the President, Dr. Gihon, at 8:15, a large assemblage of ladies and gentlemen being present. Major George M. Sternberg, Surgeon in the United States Army, delivered an able and instructive address on "Disease Germs," which was listened to with close attention by the members and visitors present.

He began by correcting the statements that appeared in the morning papers, regarding his expressions of the previous evening, made in the debate on cremation, that he was a disbeliever in disease germs. On the contrary, he was a profound believer in their existence, but was not prepared to go to the length of accepting all that had been said and claimed regarding them by observers in different parts of the world. The speaker dwelt on the morphology and extent of the class of micro-organisms, which includes all of the known disease germs, and upon the probability that in certain cases, at least, harmless bacteria may acquire pathogenic power as a result of special conditions relating to their environment. The written part of Mr. Sternberg's address was followed by extended remarks upon the various micro-organisms represented by his photo-micrographs. These were projected upon the screen by a calcium-light, with an amplification of from 50,000 to 200,000 diameters.

After this address, which occupied about an hour and a half, Dr. L. Brewer, of St. Louis, read an interesting paper upon "The Bearing of the Discovery of the Tubercle Bacillus on the Public Health."

On Friday morning the association met at the usual hour, and after some preliminary business had been attended to the advisory council reported the following nominations for officers of the association during the ensuing year:

President, Dr. James E. Reeves, of West Virginia; First Vice-President, Hon. Erastus Brooks, of New York; Second Vice-President, Dr. Henry B. Baker, of Michigan; Treasurer, Dr. J. B. Lindsley, of Tennessee.

Executive Committee, Dr. H. P. Walcott, of Massachusetts; Dr. Charles Smart, U. S. Army; Dr. George B. Thornton, of Tennessee; Dr. D. W. Hand, of Minnesota; Dr. Gustav Devron, of Louisiana; Dr. H. B. Holbeck, of South Carolina.

The reports of the Committees on Museum of Hygiene, presented by Dr. H. P. Walcott, of Massachusetts; on Vital Statistics, by Surgeon J. S. Billings, United States Army; and on the International Congress of Hygiene, by Dr. A. C. Girard, United States Army, were read by title, and ordered to be printed in the official minutes.

Then followed a paper on "The Duration of Infectiousness of Scarlet Fever," by W. W. Vinnege, M. D., of the State Board of Health of Indiana.

The sanitary interests of St. Louis were represented by a series of interesting papers, several of which, unfortunately, could only be read by title on account of the brief time left before the hour of final adjournment. These papers were contributed by city officials and local sanitarians in St. Louis, and bore the following titles:

a.—"The Situation, Soil, and Surroundings of St. Louis, considered from a Hygienic Standpoint," by Colonel Henry Flad, C. E., President Board of Public Improvements.

b.—"Organization of Health Department, Sanitary Legislation, and the Abatement of Nuisances," by John D. Stevenson, Esq., Health Commissioner.

c.—"Sources, Quality, etc., of the Milk and Meat Supplies of St. Louis," by Joseph Spiegelhalter, M. D., member Board of Health, and J. C. Cabanne, Esq.

d.—"Street-Paving and the Public Water-Supply," by Thomas J. Whitman, Water Commissioner, and J. W. Turner, Street Commissioner.

e.—"On the Average Temperatures and Prevailing Climatic Conditions of St. Louis," by Prof. F. E. Nipher, Washington University.

f.—"Public Sewerage and House-Drainage," by Robert Moore, C. E.

g.—"The Leading Local (productive) Industries, and Their Effect on the Health and Lives of Their Operatives," by George Homan, M. D.

h.—"The Infant and School Populations and Existing Causes Unfavorable to Their Health," by J. B. Kingsley, M. D., Professor of Physiology and Diseases of Children, Missouri Medical College.

i.—"The Chief Local Factors in the Causation of Disease and Death," by Robert Luedeking, M. D., Professor Pathological Anatomy, St. Louis Medical College.

During the session the President announced the following committees:

On disinfectants: Dr. G. M. Sternberg, U. S. A.; Dr. Charles Smart, U. S. A.; Dr. George H. Rohé, Baltimore; Dr. J. H. Raymond, Brooklyn; Dr. W. H. Watkins, New Orleans; Prof. V. C. Vaughan, Ann Arbor; Prof. A. R. Leeds, New Jersey.

This committee was appointed in conformity with a resolution introduced by Dr. J. F. Hibberd, of Indiana, which

had been referred to the Executive Committee, and favorably reported.

The resolution is as follows:

"WHEREAS, It is important equally for practitioners of medicine, for boards of health, and for the general public, that the highest attainments of science in this department of sanitation should be formulated for easy reference by all who need it for practical application, and especially is this desirable in view of the probable visitation of cholera in the near future; therefore be it

"Resolved by the American Public Health Association, That a committee be appointed to examine the subject of disinfectants, antiseptics, and germicides, in their relations to preventive medicines and sanitation, and that said committee formulate a table of these agents for the information of those interested, the agents to be classified so far as may be deemed advisable according to their specific virtues, facility of application, and economy of use."

This committee has been directed to report at the meeting of the conference of State boards of health, to be held in Washington in December next.

The Advisory Council is constituted as follows: Alabama, Dr. R. D. Webb, of Livingston; Arkansas, Dr. J. R. Dibrell, of Little Rock; California, Dr. F. W. Hatch, of Sacramento; Colorado, Dr. Charles Ambrook, of Boulder; Connecticut, Dr. C. A. Lindsley, of New Haven; Delaware, Dr. L. P. Bush, of Wilmington; Florida, Dr. R. B. S. Hargis, of Pensacola; Georgia, Dr. W. H. Elliott, of Savannah; Illinois, Dr. H. A. Johnson, of Chicago; Indiana, Dr. E. S. Elder, of Indianapolis; Iowa, Dr. W. S. Robinson, of Muscatine; Kentucky, Dr. Pinckney Thompson, of Henderson; Louisiana, Dr. S. S. Herrick, of New Orleans; Maine, Dr. A. G. Adams, of Portland; Maryland, Dr. G. H. Rohé, of Baltimore; Massachusetts, Dr. S. H. Dargin, of Boston; Michigan, Dr. Foster Pratt, of Kalamazoo; Minnesota, Dr. C. N. Hewitt, of Red Wing; Mississippi, Dr. Wirt Johnson, of Jackson; Missouri, Dr. Joseph Spiegelhalter, of St. Louis; New Hampshire, Dr. G. P. Conn, of Concord; New Jersey, Dr. W. K. Newton, of Paterson; New Mexico, Dr. W. T. Parker, of Fort Union; New York, Dr. J. H. Raymond, of Brooklyn; North Carolina, Dr. T. H. Wood, of Wilmington; Ohio, Dr. Harvey Reed, of Mansfield; Pennsylvania, Dr. Crosby Gray, of Pittsburg; Rhode Island, Dr. Charles H. Fisher, of Providence; South Carolina, Dr. George Simons, of Charleston; Tennessee, Col. D. P. Hadden, of Memphis; Texas, Dr. R. M. Swearingen, of Austin; Vermont, Dr. H. D. Holton, of Brattleboro; Virginia, Dr. J. L. Cabell, of Charlottesville; West Virginia, Dr. T. A. Harris, of Parkersburg; Wisconsin, Dr. J. T. Reeve, of Appleton; District of Columbia, Major S. A. Robinson, of Washington; U. S. Army, Surgeon G. M. Sternberg, of Baltimore; U. S. Navy, Medical Director A. L. Gihon, of Washington; U. S. M. S., Surgeon Walter Wyman, of Baltimore; Bureau of Education, Hon. John Eaton, of Washington.

Resolutions of respect to the memory of the late Dr. Elisha Harris, of New York, were introduced by Dr. John Rauch, of Illinois, and after a few appropriate remarks by Drs. A. N. Bell, of Brooklyn, and Henry Baker, of Michigan, were passed by a rising vote.

A committee of seven on "The Disposal of the Dead" was appointed by the President, in compliance with a resolution introduced by Dr. F. Fromento, of New Orleans. Other committees appointed were upon "Incorporation," and on "State Boards of Health."

After a vote of thanks to the retiring president "for the able, dignified, and impartial manner in which he had presided" over its deliberations, the association adjourned at one o'clock, to meet in Washington, D. C., during the month of December, 1885.

SANITARY INSTITUTE OF GREAT BRITAIN. No. II.

(Continued from page 485.)

(Special Correspondence of THE SANITARY ENGINEER.)

DUBLIN, October 4, 1884.

A SERIES of excursions to various works of interest in the neighborhood brought the Congress of the Sanitary Institute of Great Britain to an end to-day. Some little ill-natured capital has been made out of the title of the institute as applying to Great Britain alone, and Dr. Carpenter, on the day of the opening meeting, very happily put it that the warmth of the welcome received by the Congress members caused him to hope that the title would soon be amended by the words, "and Ireland." Dublin indeed offers a grand chance for the Sanitary Institute, and if it will only work out the idea and put its hand to the plough, it will earn the gratitude of all the inhabitants and visitors to Dublin. An energetical association, with its

heart in the work, should soon be able to cause an improvement in such points as the open sewer, or so-called River Liffey, which runs through the centre of the town, and the existence of which is simply astounding. People talk of the state of the Thames, with its flotsam and jetsam of sewage, but it takes only a very second position in comparison with the Liffey, which receives all day long the discharge from small, open-ended sewers, which are connected with it in all its length through the city. The Dublin members of the Congress appeared to be both capable and willing, and there should be no difficulty in the accomplishment of the object when once the question at issue between the Corporation and the Port and Docks Board relative to the position of outfall is settled. The meetings, as a rule, were well attended. Perhaps the paper which received least attention, and on the occasion of the reading of which some of the gentlemen best qualified to speak (for instance, Dr. Cameron, Medical Officer of Health, Dublin; Mr. Neville, Boro' Engineer; and Mr. H. H. Collins, of London) were absent, was one deserving of the fullest attention—i. e., "Homes of Working Classes in Dublin." Owing to the number of papers, there were, as a general rule, two being read at the same time (not in the same room), and this, of course, tended to lessen the number of speakers in the various discussions. It would have been a decided advantage had the practice of bracketing three or four papers together and having them read and then discussed *en masse* been extended. As it was, it was confined to two batches only, but with advantage to time. A fair proportion of ladies attended the meetings, incited thereto doubtless by the fact that the ladies of Dublin have a sanitary association of their own, and the admission on the part of the corporation officers that the ladies' society is of service to them deserves recognition. It is self-evident that ladies can, if they so desire, obtain information that in some instances would be held back from men; such associations therefore should be encouraged. It was matter of universal regret that Sir Robert Rawlinson, who officiated as president of the Congress, should not have felt himself equal to the task of delivering his opening address personally, Dr. Carpenter acting as his mouthpiece. The feeling of regret was in no way diminished by the statement of Sir Robert at one of the meetings that he feared he would not be able to be of any further service to Dublin.

The opening meeting of the Congress was held on the 30th ult., when Dr. Carpenter delivered Sir Robert Rawlinson's presidential address.

[The further report of the Sanitary Institute meeting will appear in subsequent issues.—ED.]

THE employment of cast-iron columns as main supports has been greatly restricted at Berlin by a regulation issued recently from the architect's department of the police authorities of that city, causing great consternation among builders. The cause of the new order is said to have been a discovery in connection with a fire last winter in the Alte-Jacobstrasse, when it was found that the hot cast-iron columns had been cracked by the effect of the cold-water jet playing upon them, so that the upper stories of the house were as near collapsing as they possibly could be. The state of the buildings in the Leipzigerstrasse and other localities where shop property abounds, has also contributed toward the issue of the regulation. It happens almost uniformly that the whole ground story, and frequently also the first floor, forms one open space, above which are inhabited floors, which have besides a plan quite different from those beneath them, when, of course, no account is taken of the old principle of "pillar upon pillar." The dividing walls of the upper floors rest uniformly upon cast-iron columns, and the safety of the family inhabiting those floors depends entirely upon the soundness of the iron supports, which, as has been pointed out above, have proved to be unreliable in case of fire. The Berlin police authorities insist upon it, that where partition-walls rest upon columns, the latter are either to be bricked in or covered with a patent plastering in such a manner that an air-space remains between the iron and the brick or plastering. In many cases a brick pier or granite pillar is prescribed.—*Philadelphia Bulletin*.

TROUT CAN'T STAND PHILADELPHIA WATER.

IT is a sad commentary on the water we drink when we read that the mortality in the trout exhibit from the Eastern Station of the Pennsylvania State Fish Commission, which came near depopulating the two tanks in which they were placed at the Pennsylvania State Agricultural Fair, is attributed mainly to the impurities in the Schuylkill water.—*Philadelphia Medical and Surgical Reporter*.

SCHUYLKILL RIVER WATER.

PROFESSOR ALBERT R. LEEDS, Consulting Chemist to the Philadelphia Water Department, has sent the following report to the Chief Engineer on the result of the analyses of samples of the Schuylkill River water:

STEVENS INSTITUTE OF TECHNOLOGY,
HOBOKEN, October 15, 1884.

COLONEL WILLIAM LUDLOW, Chief Engineer of the Water Department of Philadelphia.

Dear Sir: In response to your request that I should forward to you the results of such analyses as relate to the condition of the Philadelphia water-supply at the present time I send you the appended series, running from sample No. 585 to 593.

In the first place I desire to call your attention to the purity of the sample taken from the Delaware River, at Point Pleasant, as compared with any of the Schuylkill samples collected on the same day. The percentage of albuminoid ammonia is only 0.005 parts per 100,000, which is an unusually low percentage in river water, and indicates remarkable freedom from contamination by organic matters.

Secondly, to the relation existing between the composition of the Schuylkill water at Phoenixville and at points lower down.

Ordinarily, as you are well aware, the effect of atmospheric agencies is to diminish to a notable degree the amounts of oxidizable organic matters present in solution. But in this instance, starting at Phoenixville, where the amount of albuminoid ammonia is 0.015 parts per 100,000 (three times that present in the Delaware River at Point Pleasant on the same date), the percentage of albuminoid ammonia remains about the same, while that of free ammonia increases. The organic matter as measured by the amount of oxygen artificially required to effect its oxidation regularly increases as we go down the river, until the Spring Garden basin is reached. The analysis emphatically indicates this increment of sewage, whether we measure it by permanganate or by the photo-chemical test of its reducing action on salts of silver.

But the various data obtained in the ordinary course of analysis, while indicating the impurity of the Fairmount water, did not sufficiently explain the great difference in the taste and potability of this water as compared with that collected above Phoenixville. To this end I had recourse to analyses of the air as held in solution, and I now desire to call your particular attention to the very striking differences in the amounts and composition of this dissolved air at the various points named.

At Point Pleasant the water was thoroughly aerated and charged with oxygen containing in one litre 23.6 cubic centimetres of air, of which 6.5 cubic centimetres were oxygen gas. At Phoenixville the amount of oxygen was almost the same, being 6.4 cubic centimetres. At Roxborough, however, the amount had fallen to 4.4 cubic centimetres; at Fairmount basin to 4.13 cubic centimetres; and at Spring Garden basin (which, from many other considerations also, I am inclined to believe, is the point at which the influence of polluting agencies exhibit their maximum effect) the volume of dissolved oxygen was only 3.1 cubic centimetres. In other words, the percentage of dissolved oxygen had been reduced to less than one-half its amount at Phoenixville by the great work done in oxidizing the organic impurities which are thrown into the river between Phoenixville and Spring Garden basin, and, what is still more important, even this amount of oxygen is inadequate to thoroughly perform the work of purifying the stream, the water being left impregnated with a great load of non-oxidized organic matters. In the place of oxygen we find carbonic-acid, which has increased from 0.9 cubic centimetres to the unusual and very large amount of 2.1 cubic centimetres. But water with so low an amount of oxygen as 3.1 cubic centimetres is *dead water*, not living water. It is in a condition liable at any time to bring forward a growth of low organisms, especially the lower orders of plant growths, similar to those found in stagnant ponds.

You will probably recollect that six weeks ago, while reporting to you in person on the condition of the Schuylkill water, I stated that it was in a precarious condition, and that owing to a large amount of dissolved organic matter, and the small amount of dissolved oxygen, an abundant growth of oscillarial and similar plants might occur at any time in the reservoirs. * * * You will also recollect that I stated at the same time that the Hoboken water-supply showed, only in a much worse degree, the same features of excessive dissolved organic matter and deficient oxygen. But, warned by previous experience, the water in Hoboken having become so filled during the month of July with growing plants as to become altogether undrinkable, the chief engineer, at the second outbreak of this trouble, immediately applied the remedy which I had asked him to get ready in the meantime. That was to force in air at the pumping-station, and bring it in contact with the water in the main under the pressure of a water-lift of 180 feet.

When this was done, the greenish tinge (from plant growth) that had begun to develop itself in the reservoir entirely disappeared within forty-eight hours. The water itself, which had been bitter and nauseous to taste, became at the same time colorless, sweet tasting, and sparkling in appearance, its liveliness being due to the excess of dissolved air. The process of oxygenation under pressure has been maintained ever since that time, and will henceforth be a permanent feature of the Hoboken water-supply. While the natural quality of the water of the Hackensack

River (the source of the Hoboken supply), the stream being small and of a sluggish character, is greatly inferior to that of the Schuylkill River at Phoenixville, yet, as delivered to consumers after being submitted to oxygenation, it is utterly unlike the Schuylkill River as drunk in Philadelphia, being at all times brilliant and sparkling in appearance and worthy of being regarded as an attractive beverage.

Finally, I would most earnestly urge that the same system of purification of the water, by means of oxygenation under pressure, should be immediately applied to the supply from the Schuylkill River.

In making this recommendation I do not wish to be understood as stating that I regard the necessity of keeping such vile abominations as excrementitious and sewage matters out of the water-supply any less vital to the well-being of the community after the adoption of this measure of purification than before. But I do mean to say, judging from experience in cases where this method of purification has been tried, that it will render the present supply agreeable in taste and appearance, and effect a very notable improvement in its quality. Very respectfully yours,

ALBERT R. LEEDS,

Consulting Chemist Philadelphia Water Department.

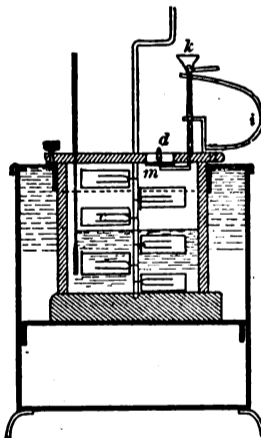
A NEW OIL-TESTER.

PROFESSOR K. HENMANN describes in the *Journal für Gasbeleuchtung* a new form of petroleum-tester, which is said to give very satisfactory results.

The author defines the flashing point to be that temperature which the oil shows when its vapor has risen to the horizontal stratum of the inclosed air in sufficient quantity to allow its being lighted. Before this point is reached an explosive vapor has formed in the body of the oil which requires more or less time to come to the surface, and during this time the temperature of the oil is continually increasing. In most testers, therefore, he considers the determination of the flashing point as untrustworthy, since it depends too much upon the rapidity of heating and the time allowed for the escape of the vapors.

The apparatus of Meyer, in which the oil is shaken up with air, and those of Stoddard, Liebermann, and Beilstein, in which air is forced through the oil, are objected to on the ground that the conditions are not such as exist in lamps.

The new tester, which is shown in the accompanying illustration, effects a homogeneous mixture of the petro-



leum vapor with a definite volume of air, and this without the disadvantages of shaking.

The apparatus consists of a rather thick glass oil-vessel, which is placed in a water-bath, and covered by a hard-rubber plate, with a thermometer inserted in one side. Through the centre of the vessel passes a brass rod, provided with forked agitators, by which the oil and the air are stirred separately. The torch consists of a brass tube, *d k*, into which illuminating-gas is introduced by the short arm seen at *k*. The gas is ignited and forms a jet about five mm. high at *d*. A plate of hard-rubber, *m*, closes the oil-vessel. When a test is to be made the bottom *k* is depressed, which submerges the flame in the glass vessel, and when the pressure is removed the torch is forced up by the spring *i*. The oil-cup is filled about one-half full, although great accuracy in this particular is not necessary. If the air and vapor have formed an explosive mixture the flame is extinguished on submerging the torch. If the flame continues burning the agitator is slowly turned until the temperature has risen one-half or one degree and the test repeated.

It is claimed that the rapidity of heating does not materially influence the result; also that the starting temperature, the size of the heating flame, the size of the water-bath and oil-vessel are immaterial. The directions for using the instrument, however, give 21° C. as the temper-

ature of the water, and the test then takes about four minutes for an oil having a flashing point of 21°.

The Abel tester, which is the standard, gives about two degrees higher results than the apparatus described, and in order to make the two instruments coincide, recourse is had to the rather novel expedient of changing the thermometer scale by this amount.

Correspondence.

THE ALBO-CARBON LIGHT.

BROOKLINE, MASS., October 28, 1884.

To the Editor of THE SANITARY ENGINEER:

WILL you kindly inform me whether there is any agent or manufacturer in New York or Boston of the so-called "albo-carbon" light? It is described to me as being in use quite extensively in London and other European cities, and as being an appliance by which a substance somewhat resembling paraffine is consumed in a gas-flame, yielding an intense white light five to eight times stronger than the gas alone can yield, the consumption of the albo-carbon being at the same time very slight—perhaps a pound per month—and the amount of heat in proportion to light being much reduced. It would seem to be a very valuable invention, and if possible I should like to try it.

Yours truly, J. C. OLMSTED.

[Referred to our readers.]

NEW YORK, October 23, 1884.

To the Editor of THE SANITARY ENGINEER:

WHAT is the percentage of saving on an average of a low-pressure gravity-return apparatus over an apparatus returning into some form of trap which ultimately discharges into a sewer? Yours sincerely, W. J.

[If the steam is not wasted from the apparatus discharging into the sewer, only the water of condensation, let run away when it is cooled to 212° or lower, about 14 per cent. will be the loss; but should the water be allowed to escape at a temperature due to high-pressure steam, say 60 pounds, it will be just about doubled, and will increase in the same ratio for higher pressures as the latent heat of steam decreases.]

SULPHUROUS-ACID AS A POISON.

INSTIGATED by the divergent views of different authorities as to the injurious character of sulphurous-acid gas, Dr. Masanori Ogata has made a series of experiments on animals in Pettenkofer's laboratory. He found that different animals differed in their susceptibility, frogs being most sensitive, then mice, rabbits, and guinea-pigs, in the order named. As little as 0.04 per cent. affected all the sorts of animals mentioned. A mouse died after two hours' exposure to an atmosphere containing only 0.06 per cent.; a guinea-pig after seven hours' exposure to an atmosphere containing 0.24 per cent. No experiments were made on human beings. The poisonous effect seems to be due to the action of the sulphurous-acid on the blood, which absorbs the gas and oxidizes it to sulphuric-acid.—*Archiv für Hygiene*.

DWELLINGS OF THE WELSH PEASANTRY.—I acknowledge that you may still find such cottages with only one living-room and one bedroom, but they are not common, and are for the most part confined to the mountain-sides, having been built by "squatters," who have subsequently claimed them. In most of the rural districts of North Wales the cottages have of late years very much improved, and in the colliery and slate-quarry districts are certainly equal to the dwellings of the working classes in America, and better than those in many countries in Europe. I am very far from denying that much has still to be done for the comfort of the Welsh peasantry, but I believe recent sanitary legislation, coupled with a real desire to act up to the dictates of duty as well as public opinion, has led the owners of cottage property to endeavor as far as their means will allow to carry out many necessary improvements, or to rebuild on plans more conducive to the health and comfort of their tenants.—*W. Cornwallis West, in the Liverpool Post*.

DRAINAGE OF ASYLUMS.—The Commissioners in Lunacy of Great Britain have issued a new edition of suggestions on the drainage and water-supply of lunatic asylums, prepared by Sir Robert Rawlinson, C. B. They say that for the largest asylum the sewer need not exceed twelve inches in diameter if of earthenware, and nine inches if of cast-iron. They advise against brick sewers or drains.

THE health authorities of Albany are trying to improve the quality of their milk-supply. Several persons have already been arrested for selling an adulterated article.

ELECTRIC-LIGHTING EXHIBITS AT THE
INTERNATIONAL ELECTRICAL
EXHIBITION.

No. II.

(Continued from page 508.)
THE WESTON SYSTEMS.

THE United States Electric-Lighting Company, operating the Weston systems, has large exhibits of both arc and incandescent lamps. The former are used in the general illumination of the hall in the main building, occupying three of the arches nearly over the centre, and in that portion of the company's space containing the engines and dynamos—about fifty in all. Twelve hundred or more 16-candle-power lamps are used in its own spaces and those of other exhibitors in different parts of the building, and about 150 125-candle-power lamps for general illumination in a large area on the Lancaster Avenue side of the main building.

In the personal exhibit of Mr. Edward Weston, the electrician of the company, the process of manufacturing incandescent-lamps is quite fully shown, as well as details of construction of accessory apparatus.

Since about the beginning of the present year the carbons of the Weston incandescent-lamps have been made from gun-cotton, by the following process. The gun-cotton, after being dissolved, is molded into cakes, which are then cut into thin sheets. These are soaked in sulphide of ammonia, which removes the nitryl and converts the structure into pure cellulose. The sheets are then rolled to the thickness desired for the filaments, which are then cut out by dies in the zigzag form adopted for the standard (16-candle-power) lamps, which form is claimed to give a more uniform illumination at all angles than the plain loop. The threads for the large (125-candle-power) lamps, however, are cut straight. The filaments are then packed in plumbago and baked several hours in a furnace. Having thus been carbonized they are treated by the Maxim process for correcting irregularities in the size and resistance. This, briefly, is as follows: The filament is held by temporary clamps in circuit in a vacuum into which a little hydrocarbon vapor has been introduced. When the current is passed the hot filament decomposes the hydrocarbon vapor, and deposits the carbon on itself. Those places which are smallest and have the most resistance become the hottest, and thus receive the largest deposit, so that the resistance is made uniform throughout.

It is claimed that no regulators are required in the Weston system, the machines being made self-controlling by proper balancing in winding, regardless of the number of lights in use. The 16-candle-power lamps of this system require an electromotive force of about 116 volts, and a current strength of a little less than one-half Ampère, and the 125-candle-power 150 volts and $2\frac{1}{2}$ Ampères, or about two lamps to an electrical horse-power.

Some of the other devices deserving special notice are: The way the lamp is fastened into its socket, by a simple bayonet-joint, securing a very good rubbing connection; a cut-out, devised by Mr. Wright, assistant electrician, in which the switch-lever turns entirely around in either direction, instead of back and forth; and the safety-plugs in which the fused lead may be very easily replaced.

The Weston system of the electrical transmission of power is shown by two machines, together representing about 6-horse-power, running lathes and planers and pumping water for a cascade.

(TO BE CONTINUED.)

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

GAS-ENGINE.

OUR illustrations show a new gas-engine, the principal features of which are the nearly total expulsion from the cylinder of the gases of combustion due to the former explosion and the charging of the cylinder again with fresh air during the time taken up by a quarter of a revolution of the fly-wheel, and the compression of fresh air and the forcing of the gas into the cylinder again during the next quarter revolution.

When the piston has been driven through the whole of its forward stroke and the force of the gas exhausted, the

two valves *a* and *b* are lifted by the rod *C*. The valve *a* opens direct to the outside air, while the valve *b* effects a communication of the cylinder with an air-reservoir, into which air at a low pressure (one pound per square inch or thereabout) has been previously pumped by the forward stroke of the engine. Upon the opening of the two valves (*a* and *b*), of which *a* is the first to open, the pressure in the cylinder due to the preceding explosion disappears, and by reason of the excess of pressure in the fresh-air reservoir, it flows into the cylinder past the valve *b*, displacing the vitiated air, as explained. This takes place during the first half of the backward stroke. When the piston has reached the middle of the cylinder both of the valves (*a*, *b*) are closed and the cylinder filled with air at the atmospheric pressure. In order, however, to perfect the charge for the purpose of the next explosion, the air has added to it the requisite quantity of illuminating-gas, and the mixture is compressed. This is effected during the second half of the piston stroke backward, the illuminating-gas being pressed into the working cylinder by the side gas-pump *G*, while the mixture of gas and air is compressed by the piston itself in its backward motion, and is ready to be exploded immediately before the working piston has arrived at the dead point, and therefore just previous to the moment of ignition.

chamber *m* is filled with an explosive gas mixture, while only combustible gas flows out of the orifice *o*. When the slide moves to the left the air and gas-supply is cut off at the moment that the passage *l* comes into communication with the port *x* leading into the cylinder, and the passage *l* is cut off from the outer atmosphere. The flame burning through the orifice *o* strikes back toward the chamber *m*, the mixture present in the same is ignited, and in turn ignites the mixture in the working cylinder through the port *x*.

The patentee is Emile Capitaine, of 99 Chancery Lane, London, England.

LIME-KILN CLUB COMMITTEE ON HYGIENE.

THE wise old bald-heads constituting the Committee on Hygiene reported in favor of the following new laws to apply to all States alike:

1. To make it a penal offense for a coachman to run away with a millionaire's daughter and then refuse to make up with his father-in-law and become his business partner.
2. To punish a man for carrying an umbrella or a cane on his shoulder in a crowd.
3. To make it an offense equal to arson to chase a man with a wheelbarrow.

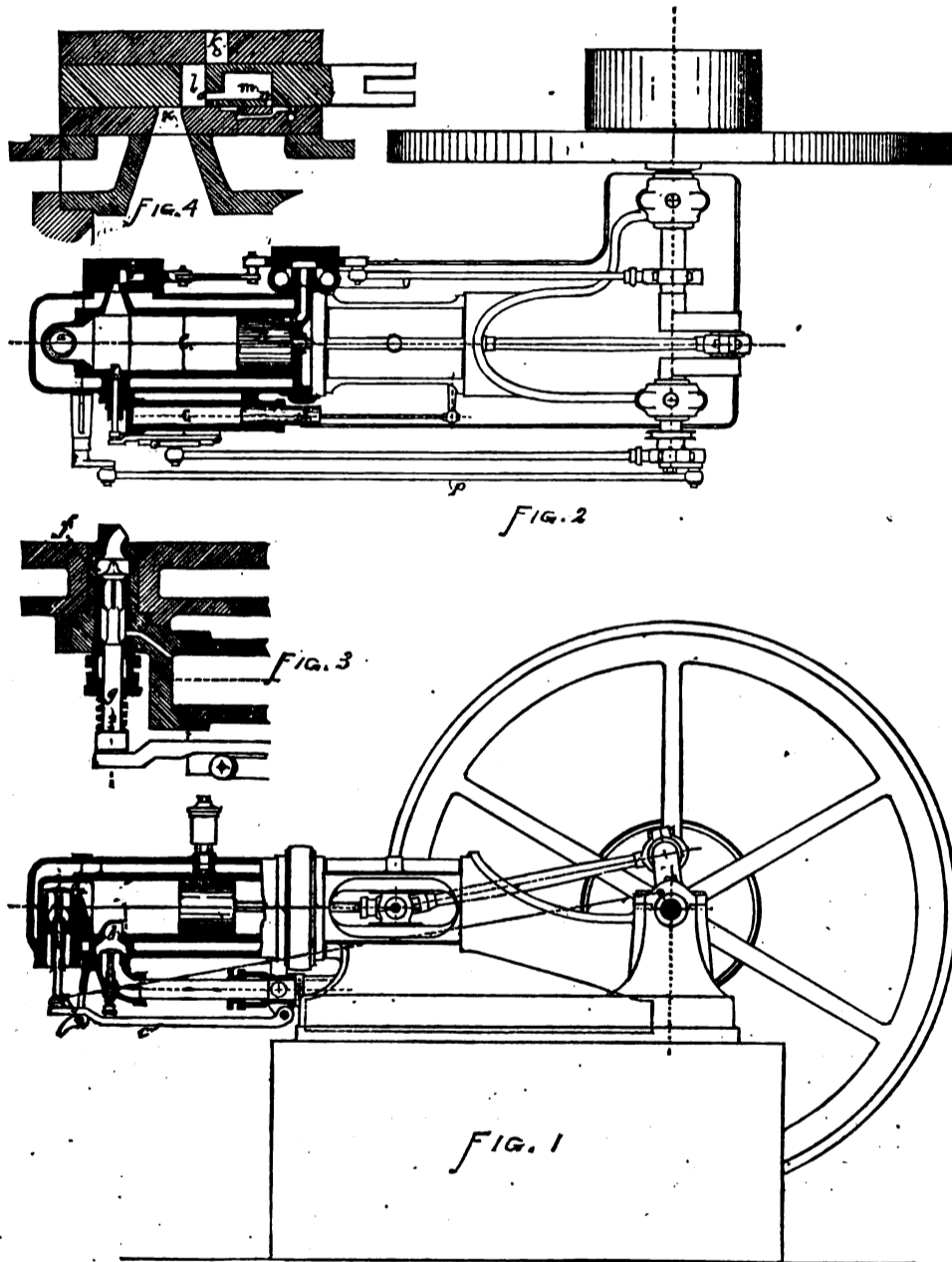


Figure 3 shows the valve for the admission of the compressed gas, and Fig. 4 is the igniting apparatus. Air is supplied through the pipe *r*, and illuminating-gas through the pipe *s*. When the slide moves to the right the passage *n* is put in communication with the pipes *r* and *s*. A mixture of gas and air flows into the chamber *m* so proportioned that it forms an explosive compound. This mixture flows through the orifice *o* in the passage *l* and thence into the space *k*, where it is ignited by a continuously burning flame. In order to guard against the ignition striking back into the chamber *m*, an additional gas-supply passage is made to open into the orifice *o*, and through which the outflowing mixture is supplied with gas to such an extent that from this point it is no longer explosive. Thus the

4. To make it a penal offense for the builder of street-cars to neglect to provide them with fire-escapes.

They also recommend the passage of some law by which the man who sets a bear-trap at the end of his hen-house shall be compelled to give public notice of the fact in at least two daily papers.—*Detroit Free Press*.

BATHING FACILITIES NEEDED.—Dr. Scott (*St. Louis Courier of Medicine*) relates the case of a native of Missouri who had not been wet all over since 1863. The doctor, being astounded at this fact, made inquiries respecting other residents of the same State. He found that not a third of the people in Missouri bathed once a month, and fifty per cent. do not take a bath from October to May.—*Boston Medical and Surgical Journal*.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING OCTOBER 25, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine	35,000	11	16.3	4	36.3	3		2								1					1		
Boston	Mass.	435,000	197	23.5	77	39.0	8		30	4	16	20	1				12	1	7			3		
Lowell	Mass.	71,500	16	11.6	5	31.2			2					1			1							
Worcester	Mass.	69,000	25	18.8	10	40.0			1	2	3	1		2			3	1				1		
Fall River	Mass.	67,000	30	23.3	18	60.0		1	1	2	6			4								1		
New Haven	Conn.	69,500	28	20.9	12	42.8			4	1	1	1		1	1		1							
Providence	R. I.	125,000	53	22.0	17	32.0	4		10		6	1		4	1	5		1	1					
Total		872,000	360	21.5	143	39.7	16	1	50	9	32	25	1	21	2	8	18	2	8			5		
EASTERN CITIES.																								
Albany	New York	103,000	27	13.6	10	37.0	1		4	2	3					1	2							
New York	New York	1,355,000	654	25.1	278	42.5	25	6	106	28	61	32		14	14	7	48		27		4	6		
Brooklyn	New York	670,000	258	20.0	99	38.3	10		36	9	19	13	1	6	8	1	14		10		1	2		
Hudson County	New Jersey	225,000	109	25.2	33	30.2	1		11		4	5		4	1	2	18		5			7		
Newark	New Jersey	154,000	85	28.7	38	44.7	1	1	10	6	8	14		2	2	4	2					1		
Philadelphia	Pa.	940,000	308	17.0	119	38.6	19	1	46	13	14	17		10	3	4	15	3	3			3		
Wilmington	Delaware	50,000	23	23.9	8	34.7	1	1	2	2	2	2		1										
Total		3,497,000	1,464	21.8	585	39.9	58	9	215	60	111	83	1	36	29	19	99	3	45		5	19		
LAKE CITIES.																								
Buffalo	New York	105,000	35	17.3	9	25.7		1	8		4	3		2		1	1	1	2					
Rochester	New York	105,000	35	17.3	9	25.7		1	8		4	3		2		1	1	1	2					
Cleveland	Ohio	140,000	47	17.4	23	48.0		1	5	1	6	8		1										
Detroit	Michigan	140,000	47	17.4	23	48.0		1	5	1	6	8		1										
Chicago	Illinois	650,000	187	14.9	92	49.1	11		17	7	14	16	1	5	4	9	4	1	3			2		
Milwaukee	Wisconsin	147,000	55	19.4	32	58.1	2		3	1	1	4		2		3	1	2	2					
Total		1,042,000	324	16.2	156	48.1	13	2	33	9	25	31	1	10	4	13	6	1	7			2		
RIVER CITIES.																								
Pittsburg	Pa.	210,000	56	13.8	21	37.5	3		9	1	3	9		5		1	4		1					
Cincinnati	Ohio	275,600	106	20.0	34	32.0	6		10	4	6	1		2		3	10	1	1		3	3		
Louisville	Ky.	94,000	27	14.9	8	29.6		1	8		3	2		3		2								
Indianapolis	Ind.	100,000	29	15.1	10	34.4	3	1	2		2			5		1						3		
Minneapolis	Minn.	75,000	18	12.5	5	27.7	1		1				1	3										
Kansas City	Mo.	375,000	152	21.1	59	38.8	8		15	5	16	7		8	7	4	6	3	2			1		
St. Louis	Mo.	375,000	152	21.1	59	38.8	8		15	5	16	7		8	7	4	6	3	2			1		
Total		1,129,600	388	17.8	137	35.3	21	2	45	10	30	19	1	26	7	10	24	4	4		3	7		
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	55	21.4	16	29.0	2		3	1	2			7	4		2	1						
"	Col.	69,300	41	30.8	14	34.1	2		8		2			2	5		1	1	1					
Richmond	Va.	41,000	17	21.6	6	35.2	1		1							1								
"	Col.	32,400	23	36.9	8	34.7	1		1		1			2	1		1							
Charleston	S. C.	25,000	19	39.5	5	26.3					2	1			1									
"	Col.	27,800	22	41.2	7	31.8			3		2													
Atlanta	Geo.	30,000	8	13.8	5	62.5	2				3			1										
"	Col.	20,000	20	52.1	14	70.0			2		8			1	1									
Augusta	Geo.																							
"	Wh.																							
Savannah	Geo.																							
"	Col.																							
Nashville	Tenn.	35,100	11	16.3	1	9.0			2	1	3	2			1									
"	Col.	21,300	5	12.2	2	40.0					1			1										
New Orleans	La.	171,000	72	21.9	18	25.0	1		4	1	6	3		1	9		1		1					
"	Col.	63,000	46	38.0	11	23.9	1		9	1	6	1			4									
Total White		435,900	182	21.7	51	28.0	6		10	3	16	6		9	15	1	3	1	1					
Total Colored		233,800	157	34.9	56	35.6	4		23	1	20	1		6	11		2	1	1					
Total in 30 U. S. Cities		7,210,300	2,875	20.7	1,128	39.2	118	14	376	92	234	165	4	108	68	51	152	12	66		8	33		
Total in 28 English Cities.																								
October 11.	8,762,354	3,319	19.8	107	39.2	107					222	31		76		54					38		9	
" 11.	1,254,607	551	22.8	19	32	19					32	15		21		12			68		20			
" 11.	858,660	370	22.4	8	25	8		48			25	2		3		17			67					
"	139 German Cities.																							
"	15 Swiss Cities.																							
"	15 Swiss Cities.																							

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

In 30 cities of the United States, having an aggregate population of 7,210,300 inhabitants, there were reported during the week which ended October 25, 1884, 2,875 deaths, which is at the rate of 20.7 per 1,000 annually. Children under 5 years of age contributed 39.2 per cent. of the total deaths. The rate in the North Atlantic cities was 21.5; in the Eastern cities 21.8; in the Lake cities 16.2; in the River 17.8; and in the Southern cities for the whites 21.7, and for the colored 34.9 per 1,000.

Accidents caused 4.1, consumption 13.0, croup 3.1, diarrhoeal diseases 3.1, diphtheria 5.7, typhoid fever 3.7, malarial fevers 3.7, scarlet fever 1.7, pneumonia 5.2, bronchitis 2.2, measles 0.2, puerperal diseases 1.1, and whooping-cough 0.8 per cent. of all the deaths. As compared with the previous week, croup, diphtheria, typhoid fever, malarial fevers, and scarlet fever show increased mortality, while a decrease is shown from diarrhoeal diseases, measles, and whooping-cough. Diphtheria caused 0.5 per cent. of the deaths in the Lake cities, 7.1 in the North Atlantic, 5.6 in the Eastern, and 4.8 in the River cities. The greatest mortality from typhoid fever was in the River cities, where it caused 6.6 per cent. of the deaths; in the North Atlantic cities it caused 5.9, and in the Southern cities 4.9

among the whites and 3.8 among the colored. Malarial fevers were most fatal in the Southern cities; among the whites they caused 8.2, and among the colored 6.9 per cent. of the total deaths.

BOSTON, MASS.—C. E. Davis, Jr., reports 44 new cases of typhoid fever, 45 of scarlet fever, and 24 of diphtheria.

DETROIT, MICH.—Dr. O. W. Wight reports 32 new cases of diphtheria and 3 of scarlet fever.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 33 cases of scarlet fever and 6 of diphtheria under treatment October 25.

BALTIMORE, MD.—The report of the Board of Health for the week ending October 25 gives the annual death-rate for the whole population 20.21 per 1,000, or 17.57 for the whites and 35.33 for the colored. The number of deaths was 159, including 58 under 5 years of age. Diphtheria caused 11 deaths, croup 4, scarlet fever 1, whooping-cough 1, typhoid fever 3, malarial fevers 3, diarrhoeal diseases 8, consumption 25, acute lung diseases 13, and violence 4.

MASSACHUSETTS.—For the week ending October 18, in 104 cities and towns of the State, having an aggregate population of 1,366,324, there were 463 deaths, which is equivalent to an annual death-rate of 17.62 per 1,000, against 17.84 for the previous week. The principal zymotic diseases caused 117 deaths, among which were diarrhoeal diseases 34, diphtheria and croup 35, typhoid fever 29, whooping-cough 5, scarlet fever 4, and measles 1. The highest rates recorded were 27.2 in Holyoke and 27.6 in New Bedford.

ENGLAND.—The return of the Registrar-General for the week ending October 11 gives the annual death-rate in the 28 large towns of England and Wales as 19.3 per

1,000. The highest rate recorded was in Blackburn, 31.6; the lowest in Halifax, 10.9. The highest annual death-rate from measles was 2.6 in Preston, from "fever" 2.4 in Derby, and from diarrhoea 3.5 in Hull and 3.4 in Sunderland. The 31 deaths from diphtheria included 16 in London, 3 in Leeds, and 3 in Liverpool. Small-pox caused 11 deaths in London.

LONDON.—Births, 2,282; deaths, 1,344, the latter being equivalent to an annual death-rate of 17.5 per 1,000. Of the decedents 499 were under 5 years of age. The fatal cases of small-pox numbered 11, of which 2 occurred in the Metropolitan Asylum Hospitals. The number of small-pox patients in the hospitals, which was 555 at the end of the previous week, declined to 520, there having been 69 new cases admitted, against 113 for the previous week. The deaths from typhoid fever numbered 25, and at the close of the week there were in the Metropolitan Asylum Hospitals 109 cases, and 7 of typhus, under treatment. Measles caused 9 deaths, scarlet fever 16, diphtheria 16, whooping-cough 11, diarrhoea and dysentery 57, consumption 18, lung diseases 227, and different forms of violence 45.

BIDS FOR BUILDING SECTIONS A AND B OF THE NEW CROTON AQUEDUCT OF NEW YORK CITY.—Opened by the Aqueduct Commissioners October 29.

SECTION A.—Extending from a point near the High Bridge northward about 11,850 feet, and having three working shafts.

No.	NAME	EXCAVATION.										MASONRY.										SHAFT					DRAINS.					TOTAL.	GRAND TOTAL,* including Backing, which is estimated at 85 per cent. of prices bid for g, h, i, and j.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
		Per Cubic Yard.					Per Linear Foot.					Per Cubic Yard.					Additional.					FILLING		Per Linear Foot.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Rock.	Earth.	Soiling.	Tunnel.	Shaft.	Brick.	Concrete.	Rubble Stone.	Cut Stone	Cement.	Per Cubic Yd.	Excavation and Maintenance of Drains.	6 in.	8 in.	10 in.	12 in.	6 in.	8 in.	10 in.	12 in.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	Engineers' estimate of quantity	1,500	1,000	5,000	76,000	151	24,000	3,000	1,000	5,500	50	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000</

SECTION B.—Extending from the end of Section A, northward about 12,300 feet, and having two working shafts.

Engineers' estimate of quantity		15,000.	9,000.	3,000.	83,000.	214.	24,000.	3,000.	1,000.	5,500.	50.	5,000.	5,000.	5,000.	600.	12,700.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,000.	1,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The unit price are

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DREDGING IN ROMERLY MARSH, GEO.—No response was made to the advertisement dated September 18, 1884, for bids to be opened on October 17, 1884, by Col. Q. A. Gillmore, Corps of Engineers, Brvt. Maj.-Gen., U. S. A.

ST. PAUL, MINN.—The contract for constructing a sewer in Valley Street has been awarded to Patrick Nash, at \$2,795.

Proposals will be advertised for a sewer in Dayton Avenue.

TORONTO, CAN.—A proposition to erect a new city hall at a cost of \$200,000 has been submitted to the tax-payers.

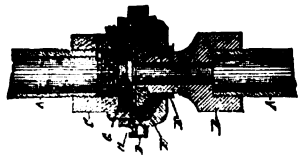
CHARLESTON, S. C.—At the meeting of the City Council, October 29, a letter from the Charleston Water-Works Company was read, asking that Council extend for five years, from January 1 next, the time allowed to the company for completing the water-mains to thirty miles. The company says it has not, at present, water enough for thirty miles of mains. The request of the company was referred to the Joint Committee on Water-Works and Water-Supply.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

299,206. INSULATING PIPE-UNION. Charles Deavos, New York, N. Y., assignor to the Archer & Pancoast Manufacturing Company, same place. Filed October 20, 1883. (No model.) Issued May 27, 1884.



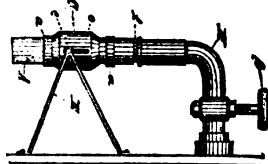
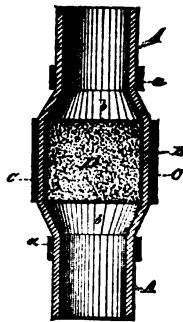
Claim.—1. The herein-described insulating pipe-union composed of the end pieces for receiving the pipe-sections, the coupling-nut for drawing said pieces together, the non-conducting disks or plates interposed between the parts, and the securing-ring, substantially in the manner and for the purposes set forth.

2. In an insulating pipe-union, the coupling-nut, the two end pieces, one of which projects through the nut, the perforated non-conducting disk, and the non-conducting shell interposed between the nut and projecting end piece, said shell being held in place by the ring upon said projecting end piece, these parts being combined and arranged substantially as shown and described.

3. In an insulating pipe-union, the combination, as before set forth, of the end pieces, the coupling-nut, the non-conducting disks, and the holding-ring having a flat bearing-face, arranged substantially as shown and described.

4. In a pipe-union of the character herein set forth, the end pieces, the removable disks, the holding-ring having a flat bearing-surface, the perforated compressible disk, and the coupling-nut, arranged and combined substantially as shown and described.

299,275. HYDRANT-FILTER. George W. Shawk and Albert S. Wetmore, Cleveland, O. Filed September 21, 1883. (No model.) Issued May 27, 1884.



Claim.—1. A hydrant-filter consisting of a flexible tube, a hollow cylinder adapted to inclose the filtering material and forced into said tube, and means for holding the same therein against displacement, substantially as set forth.

2. In a hydrant-filter, a flexible tube distended by an inclosed hollow cylinder, in combination with an outside band adapted to press the said tube upon the inclosed cylinder, substantially as described, and for the purpose specified.

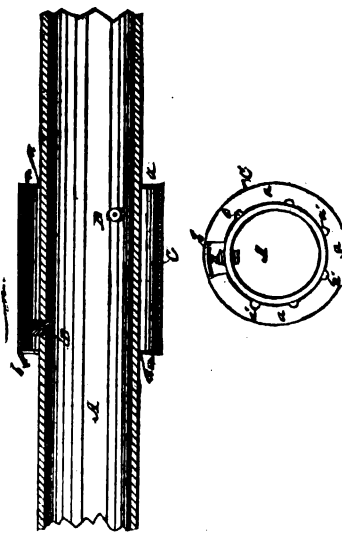
3. In a hydrant-filter, the combination, with a flexible tube, a cylinder provided with filtering material and

inserted in said tube, and means for holding the same therein against displacement, of a movable band, *a*, encircling said tube, and adapted to hold it in position on the hydrant-nozzle, substantially as set forth.

4. The combination, with cylinder *B*, provided with the gauze ends, of the flexible tube *A* and the band *C*, substantially as and for the purpose set forth.

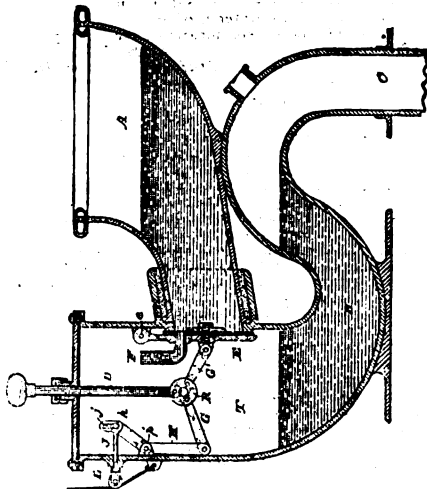
5. The bracket *E*, provided with the trunnions *e*, in combination with the band *C*, provided with the slotted bosses *c*, substantially as described, and for the purpose set forth.

299,847. IRRIGATING APPARATUS. William R. Chisholm, Laredo, Tex., assignor of one-half to Albert L. McLane, same place. Filed September 19, 1883. (No model.) Issued May 27, 1884.



Claim.—In an irrigating apparatus, the inner water-pipe having the nozzles projecting from the inner and outer surfaces of said pipe, in combination with the outer pipe or casing inclosing the outer ends of the nozzles, said outer pipe or casing having water passages or apertures in its ends, substantially as shown and described, and for the purpose set forth.

299,888. WATER-CLOSET ATTACHMENT. James W. Birkett, Brooklyn, N. Y. Filed January 14, 1884. (No model.) Issued May 27, 1884.



Claim.—1. In a water-closet, a toggle-lever having vertically-moving connecting-link, and the outer ends of its arms pivoted to and supported, respectively, by the exit-valve and the water-supply operating-lever, as set forth.

2. In a water-closet, the pull-handle *D*, push-rod *J*, pivoted bent lever *H*, and suitable connecting mechanism, in combination with a valve-controlling cord fixed at one end and adapted to be drawn downward by the thrust of said push-rod, substantially as described.

3. In a water-closet, the combination of exit-valve *E*, provided with suitable overflow, the toggle-levers *G G'*, and connecting-link *R*, interposed between said toggle-levers and the pivoted bent lever *H*, said lever *H* also being connected to and operating the water-supply-controlling devices, substantially as shown and described.

299,132. FIRE-ESCAPE. Jacob Haeghe, Garfield, Kans. Filed March 6, 1884. (No model.) Issued May 27, 1884.

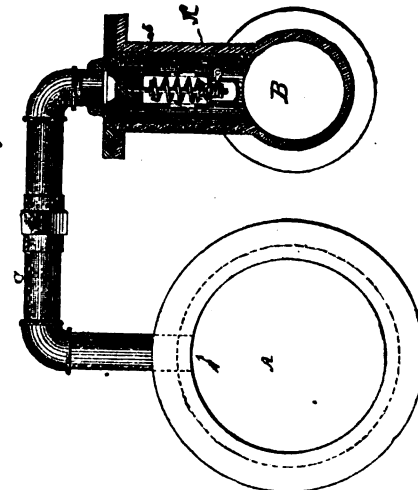
299,192. AUTOMATIC RELIEF DEVICE FOR STEAM-DISTRIBUTING PIPES. Edward H. Ashcroft, Lynn, Mass. Filed January 27, 1883. (No model.) Issued May 27, 1884.

Claim.—1. The method of distributing steam in underground mains, which consists in conveying steam of high and low pressure in separate and adjoining conduits, and permitting the excess of steam to automatically escape from the high to the low pressure conduit at various points along the line, substantially as described.

2. The combination, in an apparatus for the distribution of steam, of the main *A* with the auxiliary main *B*, having branch *A'*, and a valve located within said branch, said mains being connected by the intermediate pipe and permitted to communicate by the automatic action of the valve, substantially as and for the purpose set forth.

3. A steam-distributing main, *A*, connected with an auxiliary main, *B*, which is provided at intervals throughout its length with safety or blow-off valves, whereby the pressure in *A* is relieved by the escape of steam to *B*, substantially in the manner and for the purpose described.

4. The combination, with a steam-distributing main, of an auxiliary main connected thereto at intervals by steam-connections containing safety-valves for permitting the escape of steam from the main to the auxiliary main, substantially in the manner and for the purpose set forth.



5. The combination of main pipe *A*, relief-pipe *B*, having branch *A'*, which is provided with valve *d*, and the connecting-pipe *C*, as set forth.

299,165. WRENCH. Squire Robinson, Southington, Conn. Filed December 29, 1883. (No model.) Issued May 27, 1884.

299,175. CHIMNEY-TOP AND VENTILATOR. John M. Sheets, Nora Springs, Iowa. Filed March 25, 1884. (No model.) Issued May 27, 1884.

299,186. WATER-JACKET FOR ROTARY-PUMPS. Alexey W. Von Schmidt, San Francisco, Cal. Filed July 28, 1883. (No model.) Issued May 27, 1884.

299,252. THERMO-RESERVOIR. Edwin D. Newton, New York, N. Y. Filed June 25, 1883. (No model.) Issued May 27, 1884.

299,267. COMPOUND VACUUM-PUMP. Wilhelm Richter, Berlin, Germany, assignor to the Internationaler Vacuum-Eismaschinen Verein, same place. Filed June 6, 1883. (No model.) Issued May 27, 1884. Patented in Germany August 24, 1882, No. 22,208; in France September 27, 1882, No. 151,286, and in England September 28, 1882, No. 4,606.

299,146. FURNACE-GRATE. Thomas Kirkwood, Chicago, Ill. Filed September 14, 1883. (No model.) Issued May 27, 1884.

299,147. GRATE. Thomas Kirkwood, Chicago, Ill. Filed December 19, 1883. (No model.) Issued May 27, 1884.

299,227. CHIMNEY-CAP AND VENTILATOR. William J. Kayser, Milwaukee, Wis. Filed January 14, 1884. (No model.) Issued May 27, 1884.

299,298. WELL-BORING MACHINE. William Velte, Pittsburgh, Pa. Filed December 7, 1883. (No model.) Issued May 27, 1884.

299,341. ATTACHMENT FOR OPERATING CISTERN-VALVES FOR WATER-CLOSETS. Daniel Burrows, Brooklyn, assignor to the J. L. Mott Iron Works, New York, N. Y. Filed December 3, 1883. (No model.) Issued May 27, 1884.

299,378. PUMP. John J. Gardner, North Madison, Ind. Filed June 11, 1883. (No model.) Issued May 27, 1884.

299,885. PROCESS OF AND APPARATUS FOR PRODUCING HEATING-GAS. Hermann Haug, Dortmund, Prussia, Germany. Filed March 1, 1883. (No model.) Issued May 27, 1884. Patented in Germany, August 16, 1879, No. 13,733; in France November 19, 1879, No. 133,733; in Belgium November 26, 1879, No. 49,927, and November 10, 1881, No. 56,106; in England July 19, 1881, No. 3,145; and in Austria January 15, 1882, No. 38,269.

299,418. REVOLVING DRUM FOR GAS-METERS AND LOW-PRESSURE WATER-METERS. William Coulson Parkinson, London, Eng. Filed December 30, 1882. (No model.) Issued May 27, 1884. Patented in England May 6, 1882, No. 2,134, and in France September 20, 1882, No. 149,495.

299,419. SINKING PILES. Robert E. Peary, Cape Elizabeth, Me. Filed January 17, 1884. (No model.) Issued May 27, 1884.

299,425. WATERPROOFING CELLARS, &c. John J. Schilling, New York, N. Y. Filed April 24, 1884. (No model.) Issued May 27, 1884.

299,426. OIL-STOVE. Charles O. Schwartz, Milwaukee, Wis. Filed April 21, 1883. (No model.) Issued May 27, 1884.

299,892. PROTECTOR FOR WATER-PIPES AGAINST FREEZING. Pierre Eymond Jay, New York, N. Y. Filed June 4, 1883. (No model.) Issued May 27, 1884.

299,407. EAVES-TROUGH HANGER. Milo B. Lee, Plymouth, Ohio. Filed April 3, 1884. (No model.) Issued May 27, 1884.

299,440. PIPE-WRENCH. Conrad D. Volkmann and William F. Peddy, Nappanee, Ind. Filed January 18, 1884. (No model.) Issued May 27, 1884.

299,449. COMBINED CURBSTONE AND TELEGRAPH-WIRE CONDUIT. James S. Woodward, Philadelphia, Pa. Filed December 18, 1882. (No model.) Issued May 27, 1884.

299,476. OVERFLOW-TRAP FOR WASH-BASINS, BATH-TUBS, &c. William T. Jebb, Buffalo, N. Y. Filed March 24, 1884. (No model.) Issued May 27, 1884.

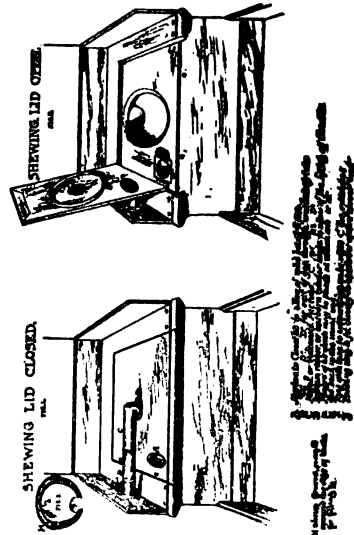
299,478. PUMP. Axel Jorgensen, Keystone, Minn. Filed September 6, 1883. (No model.) Issued May 27, 1884.

299,485. GRATE FOR BURNING SAWDUST. Michael J. Lyons, Saginaw, Mich. Filed March 20, 1884. (No model.) Issued May 27, 1884.

299,487. PUMP. James R. Maxwell, Cincinnati, assignor to the Gordon & Maxwell Company, Hamilton, Ohio. Filed September 15, 1883. (No model.) Issued May 27, 1884.

English Patents.

2,929. IMPROVEMENTS IN AND CONNECTED WITH WATER-CLOSETS.



The invention relates to the ventilation of water-closets, and has for its object to provide means of carrying off foul gases which may escape from the closet when the valve is opened for the purpose of emptying the basin after use, and to enable the lift-up handle to be raised for the purpose of opening the said valve after the lid of the closet-seat is closed, and to prevent such gases from contaminating the atmosphere of the apartment.

Frederick Piercy, of Pall Mall, East, in the city of Westminster.

Prov. Spec. June 12, 1883. Letters patented December 12, 1883. (Price 6d.)

(Continued on page 540.)

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopoeial requirements. We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

W. H. SCHIEFFELIN & CO.

New York:
175 WILLIAM STREET.

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CRAIG, J. & M., Kilmarnock (near Glasgow), Scotland. Fire-Clay Sinks. P. 541.

CAPPER, SON & Co., London, Eng. The "Twin-Basin" Water Closet. P. 541.

DOULTON & Co., London, Eng. Sanitary Specialties. P. 541.

HARTSHILL BRICK AND TILE CO., Stokes-on-Trent, Eng. Tiles. P. 541.

HOUGHTON & Co., London, Eng. Sanitary Specialties. P. 541.

HYGIENIC AND SANITARY ENGINEERING CO. (LIM.), London, Eng. Sanitary Specialties. P. 540.

JOHNS, EDWARD, Rugeley, Eng. Plumbers' Earthenware. P. 541.

KEITH, JAS., London, Eng., and Edinburgh, Scotland. Heating and Ventilating. P. 541.

KING, P. S., & SON, London, Eng. Publishers and Booksellers. P. 540.

POPPELWELL, COLTON & Co., London, Eng. Patent Agents and Consulting Engineers. P. 540.

SMALPAGE & SON, London, Eng. Tailors. P. 540.

THE LANGHAM HOTEL, London, Eng. P. 540.

THE NORTH BRITISH RUBBER CO. (LIM.), Edinburgh, Scotland. Rubber for Sanitary Purposes. P. 540.

WOODWARD, JAS. SWADINCOFF, near Burton-on-Trent, England. Sanitary Specialties. P. 541.

ENGLISH PATENTS.

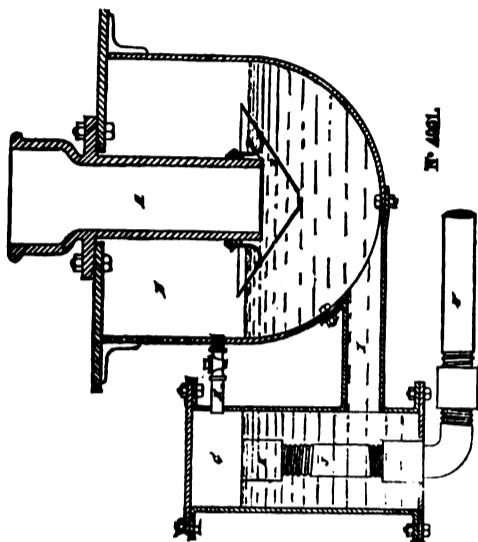
(Continued from page 539.)

528. IMPROVEMENTS IN VENTILATORS, to be as follows:

The object of this invention is to obtain the more efficient ventilation of buildings, chimney-stacks, and ships by means of ventilators without mechanical motion, constructed in such a manner that rain-water cannot be driven into the extraction-shaft, and consists in forming the ventilator with a series of deflectors arranged vertically, one series of deflectors being placed immediately opposite the openings of the next series of deflectors. By this means the wind does not directly act on the extraction-shaft or tube, so that in whatever way the wind is blowing, down-draught in the extraction-tube will be prevented by the deflectors.

Robert Pollock and Thomas Hopkirk Herbertson, of 5 Middle Row, Aldersgate Street, London, in the county of Middlesex.

Specification January 2, 1884. (Price 4d.)

4,091. IMPROVEMENTS IN APPARATUS USED IN THE MANUFACTURE OF GAS.

This invention may be applied to apparatus used for different purposes in the manufacture of gas, but is specially adapted for use in connection with the dip-pipes and hydraulic-main, and in the construction of washers; the object being in combining it with the dip-pipe to greatly relieve the retort from the pressure of gas when the coal is being distilled, and at the same time affording an effective seal to the dip-pipe when gas is not flowing through it, and when used in the construction of washers to insure the more thorough washing of the gas, and to reduce the pressure such washing frequently produces.

John Somerville, of the South Metropolitan Gas-Works, Old Kent Road, in the county of Surrey. Prov. spec. October 20, 1883. Letters patented April 19, 1884. (Price 6d.)

10,742. IMPROVEMENTS IN WATER-CLOSET APPARATUS, and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:

This invention has for its object improvements in water-closet apparatus. The basin has a lateral outlet into a vertical trunk, at the lower end of which is the closet-valve. The trunk is closed at the top by a cover, and the overflow from the basin is by an aperture or apertures in the side of this trunk opening into a descending exterior passage. In this passage are overlapping partitions constituting a trap to the overflow.

Samuel Benjamin Goslin, founder and engineer, and James John Brown, brass-finisher, both of the Crescent Foundry, Cripplegate, London. Com. spec. July 20, 1884. (Price 4d.)

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b* s, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown-stone dwelling; *apart house*, apartment-house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

BOSTON, MASS.—Boylston st, nr Brookside av, 2 fr dwells; o, C. L. Allen; b, J. Allen.

Pratt st, nr Linden, 2 fr dwells; o and b, H. M. Perry.

425 Dudley st, 2 fr dwells; o, F. W. Kitteredge; b, Mary G. Wetmore.

210 W 5th st, 3 fr dwells; o and b, J. V. Devine.

77 Keyes st, 2 fr dwells; o, T. Cunningham; b, J. D. Wester.

Ashford nr Linden, 2 fr dwells; o, Mrs. E. R. Rogers; b, J. W. Berry.

Pratt st, nr Ashford, 2 fr dwells; o and b, W. Goodwin.

Holden pl, nr Dudley st, 2 fr dwells; o, G. W. Prouty; b, J. M. Berry.

Taylor st, nr Water, 2 fr mechanical bldgs; o and b, A. T. Steam Lumber Co.

48 Shirley st, 2 fr dwells; o and b, G. A. Clifford.

Unnamed st, nr Holborn, 4 fr dwells; o and b, E. F. Brown.

Ashmont st, cor Dorchester av, 2 fr dwells and sts; o, F. King; b, H. McLaughlin.

Tremont st, opp Coventry, br store; o, G. Currier.

374 Beacon st, br dwell; o, J. W. Converse; b, J. H. Kelley.

86 Berkley st, br apart house; o, Florence J. Horne; b, A. Knowlton.

Neponset av, Grammar school; o, City of Boston; b, G. Currier.

Blossom st, br Primary school; o, same as last; b, R. R. Mayer & Co.

2317 Washington st, br mercantile bldg; o, J. P. Robinson estate; b, J. W. Coburn & Co.

CINCINNATI, O.—N E cor of Molitor and Bellevue avs, 2 1/2-story br and 1 1/2-story fr bldgs; cost, \$10,000; o and b, Otto Kramer.

DENVER, COL.—Broadway and 15th st, 5 2-story br sts; cost, \$25,000; o, W. H. Jackson; a, F. Hale.

Cor Colfax and Grant avs, 2-story dwell; cost, \$28,000; o, K. G. Cooper; a, W. Kinzill.

DETROIT, MICH.—670 Jefferson av, br dwell; cost, \$10,000; o, Jas. McGregor; a, Donaldson & Meir; b, A. Albrecht.

Fremont st, br church; cost, \$6,000; o, St. Joseph's Society; a, Donaldson & Meir; b, A. Albrecht.

38 Peterboro st, br dwell; cost, \$11,000; o, Joseph Taylor; a, G. W. Lloyd; b, W. G. Vinton.

MADRID, N. Y.—Fr dwell; cost, \$3,000; o and b, D. Smead; a and b, Johnston & Buell.

WORCESTER, MASS.—Main st, fr dwell; cost, \$7,000; o, H. L. Stockwell; a, A. P. Cutting.

London st, fr dwell; cost, \$5,000; o, G. Stevens; a, Barker & Nourse.

MISCELLANEOUS.

ADRIAN, MICH.—A skating-rink, to cost about \$8,000, will be erected at once after plans by Architects Watkins & Arnold, of Detroit.

ERIE, PA.—Architects Donaldson & Meier, of Detroit, Mich., have made plans for a dwelling for C. F. Adams, to cost \$20,000.

GALESBURG, ILL.—Plans have been made by Architect E. F. Myers, of Detroit, Mich., for a court-house, to cost \$130,000.

GREENVILLE, MICH.—Mrs. George Keith will build a residence, to cost \$5,000, this season after plans by Architects Watkins & Arnold, of Detroit.

(Continued on page 542.)

*Proposals.***PROPOSALS FOR STONE AND BRICK WORK AT JEFFERSON CITY.**

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 1, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 18th day of November, 1884, for all the labor and material, stone, brick, mortar, etc., and building complete the basement walls of the Court-House, Post-Office, etc., building at Jefferson City, Mo., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,

Supervising Architect.

PROPOSALS FOR STONE AND BRICK WORK AT DALLAS, TEX.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 1, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 18th day of November, 1884, for all the labor and materials, stone, brick, mortar, etc., and building complete the basement and area walls of the Court-House, Post-Office, etc., building at Dallas, Tex., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,

Supervising Architect.

PROPOSALS FOR MARBLE TILING AT KANSAS CITY, MO.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 1, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 22d day of November, 1884, for furnishing and laying all the marble tiling required in the Custom House and Post-Office building at Kansas City, Mo., in accordance with the drawings and specification, copies of which and any additional information may be obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,

Supervising Architect.

PROPOSALS FOR SAFES AND VAULTS FOR THE U. S. TREASURY DEPARTMENT.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 23, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 25th day of November, 1884, for supplying the burglar-proof safes and chests, fire and burglar safes combined, fire-proof safes, fire-proof doors, shell-safes, and single and double steel-lined vault-work required by the Treasury Department, and as may be ordered during the fiscal year ending June 30, 1885, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office on and after November 5, 1884.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,

Supervising Architect.

PROPOSALS FOR IRON-WORK AT ST. LOUIS, MO.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 24, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 8th day of November, 1884, for furnishing and fixing in place, complete, the cast-iron ornamental panels for area railing around the Custom-House and Post-Office building at St. Louis, Mo., in accordance with drawing and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the custodian at the building.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,

Supervising Architect.

PROPOSALS FOR JOINER'S WORK AND WOOD FLOORING AT JACKSON, MISS.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 21, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 11th day of November, 1884, for furnishing and fixing in place all the joiner-work and wood flooring required for the Court-House and Post-Office building at Jackson, Miss., in accordance with drawings and specification, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,

Supervising Architect.

IMPROVING FLUSHING BAY, NEW YORK.

ENGINEER OFFICE, U. S. ARMY,
Room 31,
ARMY BUILDING, Cor. Houston and Greene Sts.,
NEW YORK, October 9, 1884.

Sealed proposals for improving the Channel through Flushing Bay, New York, will be received at this office until twelve (12) o'clock noon, on Wednesday, November 12, 1884.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders, may be had on application at this office.

WALTER MCFARLAND,

Lieut.-Col. of Engrs.

IMPROVING NEWTOWN CREEK, N. Y.

ENGINEER OFFICE, U. S. ARMY,
Room 31,
ARMY BUILDING, Cor. Houston and Greene Sts.,
NEW YORK, October 10, 1884.

Sealed proposals for improving the Channel of Newtown Creek, N. Y., will be received at this office until twelve (12) o'clock noon, on Wednesday, November 12, 1884.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders, may be had on application at this office.

WALTER MCFARLAND,

Lieut.-Col. of Engrs.

STONE FOR DELAWARE BREAKWATER HARBOR.

UNITED STATES ENGINEER OFFICE,
1125 Girard Street,
PHILADELPHIA, PA., October 16, 1884.

Sealed proposals, in triplicate, will be received at this office until 12 o'clock M., of Saturday, November 15, 1884, and opened immediately thereafter, for 23,000 tons of stone, more or less, to be used in the construction of the Delaware Breakwater Harbor.

For blank forms, specifications, etc., apply at this office.

W. H. HEUER,

Maj. of Engineers, U. S. A.

OFFICE OF CHIEF QUARTERMASTER, DEPARTMENT OF THE EAST, GOVERNOR'S ISLAND, N. Y. H., October 15, 1884.

Sealed proposals, in triplicate, subject to the usual conditions, will be received at this office and the offices of the Quartermaster at the posts mentioned below, until 12 o'clock M., Eastern time, on the 15th day of November, 1884, at which time and places they will be opened in the presence of the bidders, for the construction of one set of barracks of brick, or frame, at each of the posts of Fort Adams, R. I., and Fort Hamilton, N. Y. H., in accordance with plans and specifications, which can be seen at this office, and at the offices of the Post Quartermaster at Fort Adams, R. I., and Fort Hamilton, N. Y. H.

One copy of this advertisement should be securely attached to each triplicate proposal, and be mentioned therein as comprising part of it.

Blanks for proposals and information as to the manner of bidding, etc., can be obtained at this office.

Proposals must be accompanied by a guarantee with two sureties, in the sum of two hundred dollars.

A proposal not accompanied by such a guarantee will not be considered.

Envelopes containing proposals should be marked "Proposals for Construction of Barracks."

The Government reserves the right to reject any or all bids.

ALEX. J. PERRY,

Asst. Quartermaster-General, U. S. A.

PROPOSALS FOR DREDGING.

U. S. ENGINEER OFFICE,
2107 Pennsylvania Ave.,
WASHINGTON, D. C., October 14, 1884.

Sealed proposal for dredging in York River, Va., will be received at this office until 12 M. on November 20, 1884, and opened immediately thereafter.

Specifications, containing detailed information, and blank forms of proposals, can be obtained at this office. The right to reject any or all proposals is reserved.

S. T. ABERT,

U. S. Civil Engineer.

Plans and specifications for a hospital building at Shreveport, La. (charity hospital), will be received until November 10; all outbuildings, etc., for about 90 patients. Appropriation, in all, \$20,000. Address PETER J. TREZEVANT, Secretary of Shreveport Charity Hospital.

Prison labor to let. Proposals for labor of male prisoners of the house of correction at Ipswich, Mass., about 100 in number. Until November 10. Address COMMISSIONERS OF ESSEX COUNTY, Salem, Mass.

Constructing sewers in map O, district 37, sub-division No. 20, Brooklyn, N. Y. Two sureties of \$10,000. Until November 8. Address WILLIAM H. FLEMAN, Commissioner, Department of City Works, Brooklyn, N. Y.

Materials and labor for brick school-house in sub-district No. 9, Madison township, O. Until November 22. Address A. M. SKUTER, Township Clerk, Groveport, O.

Fencing lots and flagging sidewalks on Bergen Street, West Ninth Street, Hamilton Avenue, Clinton Street, Concord Street, St. Mark's Avenue, Vanderbilt Avenue, Third Avenue, Fourth Place, Cheever Place, John Street, Navy Street, Eighth Avenue, Vanderbilt Avenue, West Ninth Street, Brooklyn. Until November 10. Address WILLIAM H. FLEMAN, Commissioner, Department of City Works, Brooklyn, N. Y.

Dredging and rock excavation in Caloosahatchie River, Fla., Suwanee River, Fla., and Harbor at Cedar Keys, Fla. Bids must be separate for each work. Until November 18. Address Capt. WILLIAM T. RUSSELL, U. S. Engineer Office, Jacksonville, Fla.

Erection of brick court-house, stone facing, 40' x 75' tower. Architect, J. F. Schneider, 933 F Street, N. W. Washington, D. C. Until November 24. Address L. S. WALKER, Clerk of Board of Supervisors of Shenandoah County, Woodstock, Va.

The municipality of the city of New Westminster are prepared to offer the sum of \$50,000 as a bonus to any person or company that will build, maintain, and run a railway from the city of New Westminster to the Canadian Pacific terminus at Port Moody. Said offers to be sent into this office on or before the last day of November, 1884. By order, A. J. ALPORT, C. M. C., City Clerk's Office, New Westminster, B. C.

Building iron screw-steamer for Light-House Board. Until December 1, 1884. Address S. C. ROWAN, Vice-Admiral, U. S. N., Chairman, Office of the Light-House Board, Washington, D. C.

Building new city-hall at Richmond, Va. Until December 1. Address W. E. CUTSHAW, City Engineer.

European Adverts.

This Hotel is now completely re-decorated and combines every modern improvement and luxury. The Langham Hotel, LONDON. Accommodates 500 Guests. Built on a Gravel Soil. Inclusive terms may be arranged from 15s. per diem. All the Water used is from an Artesian Well. Postal, Telegram, and Telephone Offices. Six means of Exit.

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"Ten Minutes in the Patent Office," Guide to the Patent, etc., Act, 1883. Three stamps.

GOLD, SILVER, AND BRONZE MEDALS.

LATEST AWARD,

GOLD MEDAL AT NICE, MAY, 1884.

THE HYGIENIC AND SANITARY ENGINEERING CO. (LIMITED), 23 and 24 Charing Cross, London, have purchased the Patent Rights and Business of Mr. DANIEL T. BOSTEL, of Brighton and London, including BOSTEL'S "EXCELSIOR" WATER CLOSET. With the facilities at their command they can promptly supply the Trade with the various BOSTEL SANITARY APPLIANCES, and the following American specialties:

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SELF-CLOSING COCKS, AND THE TUCKER

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The Company, having secured the services of Mr. Bostel as Managing Director, undertake the sanitary inspection of premises, and with their own skilled artisans execute any work in connection with the drainage and water-supply of buildings.

Inspections and work are under the personal supervision of Mr. Bostel, whose 25 years' practical experience is a guarantee that these important matters will be intelligently and faithfully attended to.

LONDON, October, 1883.

ILLUSTRATED PRICE-LISTS SENT ON APPLICATION.

EXHIBIT:

International Health Exhibition, Class 23-508.

THE SANITARY ENGINEER.

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NUMBER 24. } PUBLISHED EVERY THURSDAY.

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LONDON, NOVEMBER 27, 1884.

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Continental subscriptions are also received by F. A. BROCKHAUS, Esq., Querstrasse 29, Leipzig, Germany, and ASHER & Co., Unter den Linden, Berlin.

Subscriptions to the Continent of Europe and Australia, \$5; China, Japan, Sandwich Islands, Mexico and Cuba, \$5; South America, \$5. The date when the subscription expires is on the Address-Label of each paper, the change of which to a subsequent date becomes a receipt for remittance. No other receipt is sent unless requested.

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WATER-WASTE PREVENTION.

It is gratifying to see that our labors in behalf of water-waste prevention are beginning to show some results in this country. In Volume VII. we published a series of articles showing what had been done in English cities, and in Cincinnati and Providence, by honest, systematic effort. It is, therefore, a pleasure to be able to offer further American evidence in the same direction, and we invite a perusal of an extract from the report of the Boston Water Board, elsewhere printed. We hope that under New York's new municipal management an honest effort will be made to stop the criminal waste now prevailing.

The report of the Boston Water Board, which is published under date of May 1, 1884, but which recites the operations of the department up to September 1, 1884, in the matter of waste-prevention, is startling as exhibiting the utter falsity of the complaints that have been made for years by managers of public water-supplies in America, that it is impossible to keep consumers from wasting water. They have said so in Boston year after year, just as they have in New York and everywhere else, but the fact is that they have never tried to stop waste except by exhortation, which has proved as effective as a judge's charge to a grand jury is in preventing crime. But the present Boston Water Board has gone to work systematically and sensibly, and has already produced results even more extraordinary than those brought about in Cincinnati by a similar procedure. In Cincinnati the result of a systematic inspection of waste by means of the Bell waterphone, and the subsequent repairing of fixtures leaking by accident or on purpose, reduced the daily consumption 16 per cent. (from 23 million gallons in 1881 to 19.3 million gallons in 1883), and the cost of fuel for pumping from \$75,257.63 to \$54,671.75. In Boston the application of the Deacon waste-detector on the mains and the Church stop-cock on service-pipes reduced the daily consumption of May, June, July, and August 28 per cent. (from 32.3 million gallons in 1883 to 25.1 million gallons in 1884) in the Cochituate department, and 12 per cent. in the Mystic department.

It is estimated that this reduction of consumption is equivalent to a saving of \$1,200 per day during the first eight months of 1884. This saving does not bring inconvenience to a single consumer. The quantity of water supplied for actual use is not curtailed in the slightest degree, and no individual suffers in consequence of the restrictions placed on the immoderate waste of careless water-takers, for which, under the absurd existing system of selling water by guess-work, the careful consumer has to pay more than his proper share. It is time that the officials of other cities where water is wasted either take up the matter of waste-repression in earnest, or are themselves looked after by the taxpayers, who have to foot the bills for needless extensions of works of supply.

THE IMPROVEMENT OF MEDICAL EDUCATION.

THE magnificent gift of half a million of dollars recently made by Mr. William H. Vanderbilt to the College of Physicians and Surgeons of the City of New York, has been received with general commendation by both the medical and secular press, and we congratulate both Mr. Van-

derbilt and the college upon it. It is announced that the greater part of the money is to be expended in the purchase of land in the vicinity of the Roosevelt Hospital, and in the erection thereon of buildings carefully planned and completely equipped for carrying on medical teaching according to the latest and most approved methods.

That there is need in New York City of properly equipped laboratories for scientific work and teaching in various branches of medicine there can be no doubt; but whether this is the most urgent present need for medical education in this country is a question with regard to which we must answer in the negative. The most urgent need for a medical school is a sufficient endowment fund to make it absolutely independent of the fees received from students, so that it shall not be a mere business speculation on the part of the professors, holding out constant temptations to them to "make things easy" for the students in order to attract as many as possible.

At the present time there is no medical school in the United States which is so endowed as to insure this, unless we except the Medical Department of the Johns Hopkins University in Baltimore, and this department is not yet fully organized.

It is very natural that a wealthy donor, knowing little of what is most needed in medical education at present, should prefer to make a gift of a handsome building which shall be a public monument of his liberality, but it is none the less to be regretted that we should not have in the commercial metropolis of the United States one medical college with well endowed chairs, which should require a good preliminary education of those who wish to avail themselves of its advantages, and only give its diploma of Doctor of Medicine to those who have received a training at least equivalent to that which the candidate for an M. D. from the best German Universities must have had.

The testimony of the leaders of the medical profession in this country is unanimous to the effect that we need some institutions which shall give a higher grade of medical education than is now required for the diploma of any medical school which we have, and this cannot be secured by merely providing fine buildings. The utility of these depends largely upon the teachers who are to use them; they should be first-class men, who will give their whole time to the work, and aim to increase knowledge as well as to impart that which is already known. Such men must be paid, and paid well; it is their whole time and thought and energy which is demanded. They should not look on their positions as being chiefly valuable as a means of advertising or as a stepping-stone to a lucrative practice, or as a means of eking out a scanty subsistence; nor should they be compelled to waste their time on the ignorant and careless for fear that otherwise they will not get fees enough to pay for their labor.

We sincerely hope that the College of Physicians and Surgeons will endeavor to become a school for such higher medical education as we have indicated, and that as a necessary preliminary it will use every effort to secure a satisfactory endowment fund; and we would call the attention of our wealthy citizens to this matter, with the assurance that in no way can they more surely advance the interests of the community and secure undying fame for themselves as wise and far-seeing benefactors of their race than by contributing to secure such endowments.

IMPORTANT DECISIONS AFFECTING SANITARY MATTERS IN NEW YORK CITY.

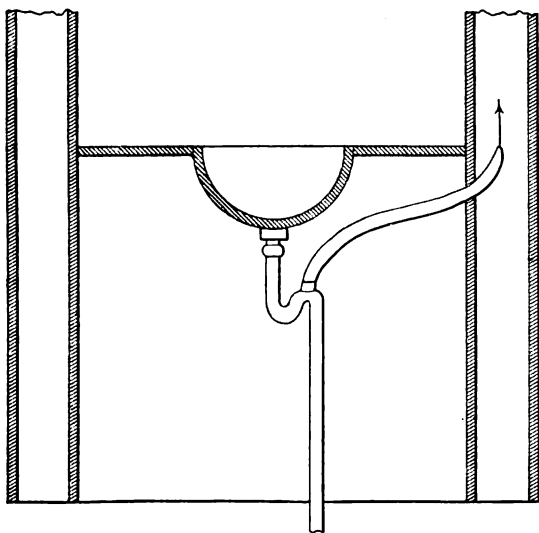
WE congratulate the Board of Health of this city, and its attorney, Mr. William P. Prentice, on the successful prosecution of several important cases, one of which is related below, wherein decisions have been obtained confirming the board's action in repressing nuisances and enforcing the plumbing law. We think there has been for a few years back a decided stiffening of popular opinion in support of the board, which the prosecution of these cases testifies to, and we believe the power of the board for good will be materially increased by the result.

The first cases were those against David H. King, Sr., owner of tenement-houses on Monroe, Madison, and Pell Streets in this city. The board has had much difficulty in securing the enforcement of orders against property understood to be owned by King, as he has denied the ownership. In the case of the houses at 31 Monroe Street, complaints were made of their condition by the tenants themselves. Inspection by the board found them dilapidated and filthy; walls and ceilings were broken, privy-vaults full and offensive, pools of filthy water were collected in the yard, the waste-pipe was not ventilated, rubbish and filth were found in cellars, and other defects existed. The board issued orders for improvements, which were not carried out, and finally King was arrested, June 23, on two complaints, and brought before the police court, giving bail to appear before Special Sessions in each.

The trial of the first case came on October 24; of the second case on October 29. In each the prosecution, in order to prove King's ownership of the property, put in evidence deeds conveying it to King, and also proof that he had not conveyed it to any other person, so far as the records declared. King, however, attempted to substantiate his assertion that he was not the owner, by offering in evidence a deed to third parties, and to his wife, Letitia King, the consideration being \$1. The deed had not been recorded. He also tried to prove by his brother, Daniel King, that the said Daniel was his wife's agent for the property, and that he, the defendant, had nothing to do with its management. The board was then obliged to compel the attendance of unwilling witnesses from among the tenants to testify that David King had himself collected the rents.

The court held that the board had established King's responsibility for the insanitary condition of the premises, and fined him \$250 in each case.

THE trial of Thomas C. Holland, plumber, of this city, for criminally negligent work, was held before Special Sessions, November 6, and resulted in the imposition of a fine of \$250. In default of payment Holland was sent to prison. This



peculiarly glaring case was described in our issue of September 25, page 384, and it is now only necessary to call attention to the accompanying

cut to make plain the nature of the job. Dummy vent-pipes from wash-basin traps had been run in to partitions and there terminated. The ends of these vents had been roughly battered together, but were, of course, not tight, and allowed foul air to escape into the partitions. The whole arrangement was designed simply to deceive the Board of Health Inspectors; and to assist in carrying out the deception, a dummy terminal-pipe, supposed to be the end of a ventilating pipe, was fastened to the roof. The dummy had no connection with any *bona fide* pipes inside the house.

WORK FOR PLUMBERS' ASSOCIATIONS.

THE Executive Committee of the National Association of Master Plumbers at the St. Louis meeting issued an address to the master plumbers of the United States, which, in view of the recent bitter controversy, is, on the whole, temperate, conciliatory, and altogether a more commendable paper than any that they have recently sent out. While not being able to agree with them in their reference to the late controversy as to the supposed ill feeling entertained toward them by any manufacturers, we are yet able to congratulate them on their avowal of the following sentiments: "The national and local associations of the master plumbers are organized for the purpose of advancing good plumbing-work; to teach the intelligent boys the trade of plumbing; to advise the journeyman plumber and to teach him that his interest lies in sobriety, morality, and good workmanship; to unite the master plumbers so that they too can educate themselves in sanitary science; to drive out from the trade botches and men who will not educate themselves, and who bring discredit to the trade." They also advocate laws requiring qualifications, as in the case of physicians, before plumbers shall be licensed to do work. They further give the sensible advice "to open your meetings to the press and public, so that they may hear your discussions on sanitary work."

We think every friend of the plumbers' associations in the United States will agree with us that the scope of the reforms here outlined is sufficiently wide for useful effort by these societies. The proposition to "drive away from the trade botches and men who will not educate themselves, but who bring discredit to the trade," is a most worthy one, yet one of the most difficult to handle, if the St. Louis idea of plumbing societies should prevail, since there it is assumed that every man who does the business of plumbing is competent to be a member, and is a member. Now, as a matter of fact, there must be some botches and men not fit to rank as reputable plumbers in every city. We know there are such in New York and Brooklyn, and we cannot believe that in our Western cities they are so fortunate as to be exempt from the ravages of these botches. We therefore suggest that a good subject for debate in some of our live plumbing associations, such as the one in Chicago, for instance, would be, "Who shall be eligible for membership of a plumbing society, when such membership is to convey some guarantee to the public that the member is capable and worthy of the confidence of a customer?" We should like very much to see this matter discussed and to hear suggestions as to what qualifications shall make a man eligible to become a member. In considering this point it would be well to bear in mind that the society which places restrictions on its membership could obviously not attempt to handle the trade-protection matter on the St. Louis and Brooklyn plan, as it could not include all buyers, though its membership would be likely to include most of the best men in the trade, and their influence and patronage would be worth cultivating by leading firms and manufacturers.

We throw out these few hints, and we would be very glad to hear suggestions from the members of the societies in cities where attempts have been made to influence everybody who pretends to carry on the business of plumbing to join the associations. We recognize that in beginning a

society its restrictions as to membership cannot be as rigid as after the association is once formed. The standard should then be gradually raised, making it more difficult to become a member. Likewise, when men in their business conduct do things that are a discredit to the plumbing trade there should be some means of discipline—that is to say, they should either be expelled or suspended. The public would then have some guarantee that an association had an earnest, honest desire to advance and defend the good name of its members. It will be obvious that in dealing with cases of this sort great tact, prudence, and firmness must be exercised, lest injustice be done and the members and society be injured.

All things considered, we are rather pleased with the tone of the Executive Committee's address, which contains several texts for future editorials. Meanwhile, we trust we have, in the foregoing suggestions, indicated a topic that can be discussed with profit and interest by our plumbing associations.

OUR plumbing readers will find the report of the Plumbers' Congress in London, printed elsewhere in this issue, of interest. A number of papers were read dealing with the technical instruction of plumbers, apprenticeship, the establishment of metropolitan and provincial boards of examiners of plumbing-work, the registration of plumbers, and the formation of district associations. A resolution was passed declaring it desirable that architects should not in future include plumbers' work in builders' contracts. At the final meeting it was agreed unanimously that the Plumbers' Company should be requested to adopt the best means of carrying out the various proposals above alluded to, and of uniting the plumbers throughout the Kingdom in a bond of trade relationship, and in common action for the advantage of the public and the benefit of the trade.

WE have received from the New Aqueduct Commissioners, of New York, a very handsome portfolio of plans of the work for which proposals were recently received, being the two sections of tunnel immediately north of the High Bridge over the Harlem River. A general map of the proposed line of the aqueduct from New York City to the Croton Dam is given first. Then follow detailed maps of the exact location of the line on the two lower sections, followed by drawings showing the details of construction of the masonry under various conditions of the material through which the tunnel passes. The most interesting plan we shall reproduce in a subsequent issue. This shows the details of one of the deep shafts, which are necessary to facilitate rapid progress in the tunneling. These plans represent, no doubt, the latest and best methods of construction in this class of work. With so complete a set of plans prepared and printed before the execution of the work, the chances of dispute between contractors and engineers as to what class of work was intended to be called for in the contract are reduced to a minimum.

INTERNATIONAL INVENTIONS EXHIBITION, LONDON.

THE time for the reception for applications for space at the International Exhibition of Inventions, to be held in London next year, has been extended to December 31, 1884. This exhibition will be under practically the same auspices as was the Health Exhibition, just closed. It is anticipated that the inventions to be exhibited from the United States will be a most prominent feature, and this extension of time gives our people a further chance to apply for space. The classification was published in our issue of September 25, page 387.

G. W. WIGNER.

WE notice with regret, in our English exchanges, the death of Mr. G. W. Wigner, F. I. C., F. C. S., well known to our readers as one of the public analysts of England. He was editor of the *Analyst*, and at one time President of the Society of Analysts. It will be remembered that Mr. Wigner received the first prize in our food-adulteration competition of 1881, for the best essay on food adulteration. Mr. Wigner was a very active man and a great worker. His death will be a loss to the profession and to the community.

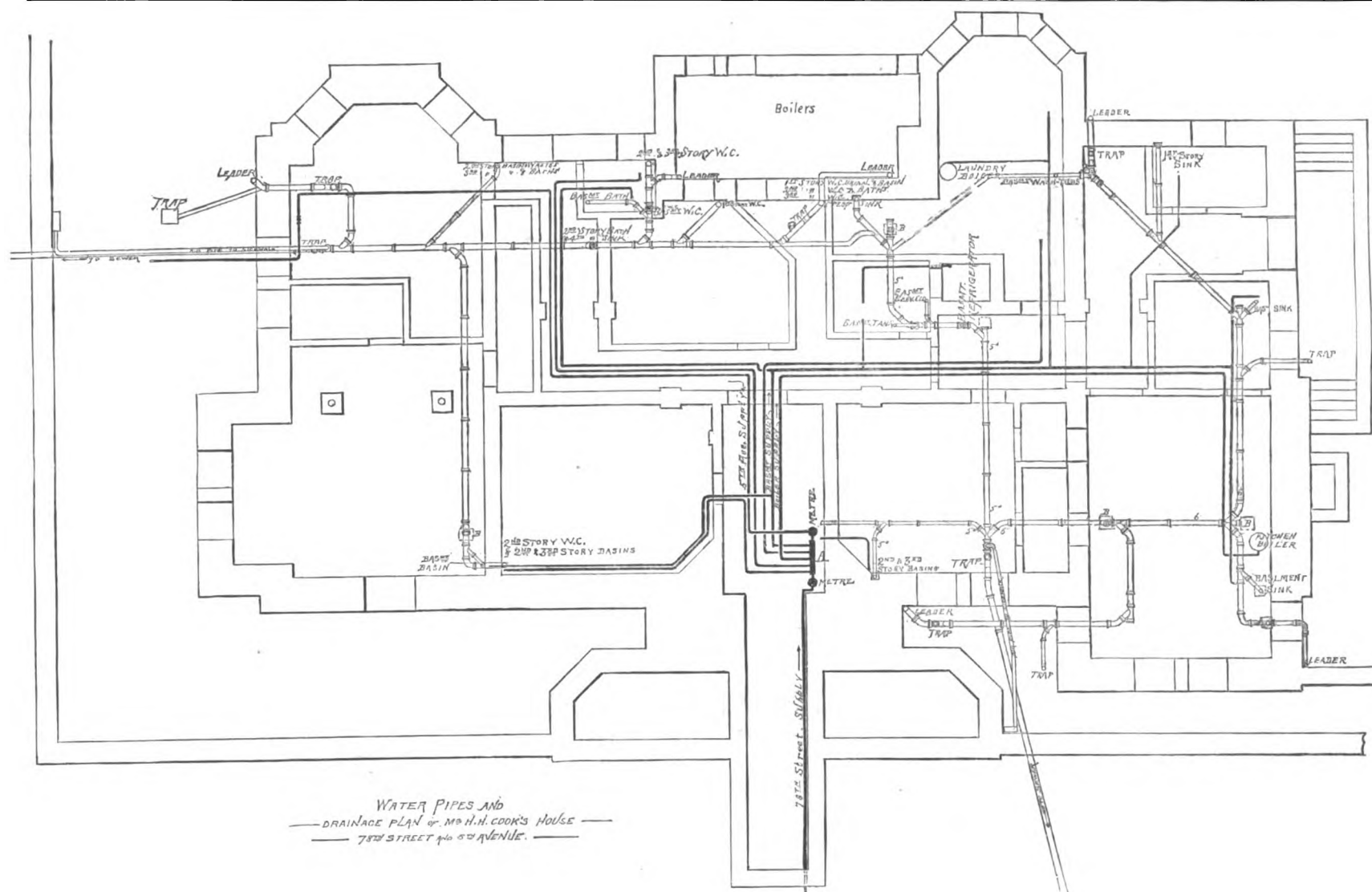


FIGURE 1.—GROUND PLAN OF MR. COOK'S RESIDENCE.

OUR BRITISH CORRESPONDENCE.

Health of Cyprus—Medical Heroism—Cholera at Yport—Sir Francis Bolton on London Water-Supply—Unhealthy House-Sites in Dublin—The Glasgow Corporation on the Duties of Salaried Officers.

LONDON, October 25, 1884.

ACCORDING to Dr. Heidenstam's report, Cyprus is not the unhealthy place that it was formerly represented to be, although sanitary reform there does not make very rapid progress. The death-rate is lower than that of England, being for the past year only a little over 17 per 1,000, and this includes accidents, which Dr. Heidenstam believes amount to five per cent. There was no epidemic last year, and "Cyprus fever" was much less prevalent than it had been in former years. The average temperature for the year was 68°; the highest recorded was 111.8° on the 15th of July, and the lowest 22° in February. The Cypriotes have therefore a great variability in climate.

A sad case of excessive zeal occurred at the Royal Free Hospital here on Tuesday. The operation of tracheotomy had been performed upon a child suffering from diphtheria; the senior medical officer, Dr. Kabbeth, in order to remove the matter that had accumulated in the windpipe, sucked the obstruction through a tube. A few days after the doctor became ill, and on Tuesday he died of diphtheria. His noble efforts to save the child's life, who, by-the-by, died, thus caused his own death at the early age of 28. This may indeed be termed "medical heroism."

People's interest here in cholera has again revived, owing to a sudden outbreak of the disease recently at Yport, near Rouen, which is coming rather near our shores. At present no evidence is forthcoming that the disease was imported there, and it is considered by those who are best informed to be a case of local origin.

The Executive Council of the Health Exhibition has just issued an interesting work on the London water-supply, prepared by Sir Francis Bolton, the Metropolitan Water Examiner. The book gives the history of the water companies and the works which they have constructed, mentions all the statutes and rules regulating the supply, and gives the various rates for the same. The book also

contains analyses and official reports showing the quality of the water, together with statistics as to quantity and details as to the sources from which the supply is taken. There are also several maps and plans showing the districts of the companies and the extent of the constant-supply system.

A reference appeared in the columns of THE SANITARY ENGINEER some time since to the endeavors of a certain individual to make the most of his property by erecting houses on a disused grave-yard. From an admission made by Mr. Young, Inspector of Cleansing at Dublin, at one of the meetings of the Sanitary Congress, it would appear that the corporation of Dublin has been highly culpable in a similar direction. Mr. Young said that waste street-sweepings and dry refuse generally had formerly been disposed of by the corporation by being shot into holes in waste ground, but as the corporation found that houses were ultimately built on these sites, the proceeding was discontinued. I should like greatly to live under the beneficent guardianship of a corporation such as this, but should prefer in such a case to ask for an analysis of the various materials which went to make up this stopping composition before taking a house which appeared to have been recently built.

Local authorities in this country are often in a difficulty on the subject of permitting salaried officers to take private employment in addition to their public duties. Formerly, say twenty years ago, there was considerable freedom in this matter, and it was supposed that town councils and local boards could obtain the services of a higher class of professional men, men with wider experience, when the line was not too strictly drawn. In recent years it has become the almost invariable practice to require salaried officers to devote the whole of their time to the duties of their office, and not to engage, either directly or indirectly, in any practice, business, or employment whatsoever. This question has lately been before the Glasgow corporation with special reference to Mr. Gale, the Water-Works Engineer. After an animated discussion a general resolution has been passed prohibiting any officer of the Glasgow corporation from engaging in private practice.

SAFETY-VALVE.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. H. H. COOK.

No. I.

WE begin in this article a description of the plumbing, with its appurtenances and such other matters as we think will be of interest to our readers, of the new house just completed for Mr. H. H. Cook, at the northeast corner of Fifth Avenue and Seventy-eighth Street, in this city, from plans by Mr. W. Wheeler Smith, architect, of No. 7 Wall Street, New York, the master plumber being Mr. James Muir, of No. 29 East Eighteenth Street, also of this city.

Our illustration, Fig. 1, is a ground plan of the building looking north. The street line, on Fifth Avenue and Seventy-eighth Street, is indicated by the area walls, the principal walls of the building being easily distinguished therefrom by their outline. The entrance is on Seventy-eighth Street, immediately over the passage through which the water-pipe, etc., from that street enters.

The sewerage and waste-pipe system of the house has an outlet to both streets, and was originally planned to be distinct and separate to each street, having no communication within the house. As the work progressed it was thought desirable to join the sections of the system at their highest point, and just at the junction of the straight run of sewer from the Fifth Avenue side, and near the position marked "slop-sink" on the plan. This change was to secure an overflow from one side or the other of the system, as a means of guarding against a temporary stoppage.

Beneath the basement there is no cellar, and for this reason the house-drains are all below the line of the basement floor. For a depth of three feet the earth has been removed over the whole surface of the ground between the walls and a concrete bottom put in of about three inches in thickness. This bottom is graded to pipes through the foundation-walls, which extend some distance from the building, that weepage from them may soak into the soil, which is sand, with rock-boulders which overlie the rock stratum which here crops up at a steep angle. On top of this concrete is a bed of loose, broken stones, 2'6" thick, through which the iron house-drains are run and in which a sufficient pitch in the direction of the street-sewers is secured. Above the loose stone again is a concrete floor six inches in thickness, upon which is laid the tiles which

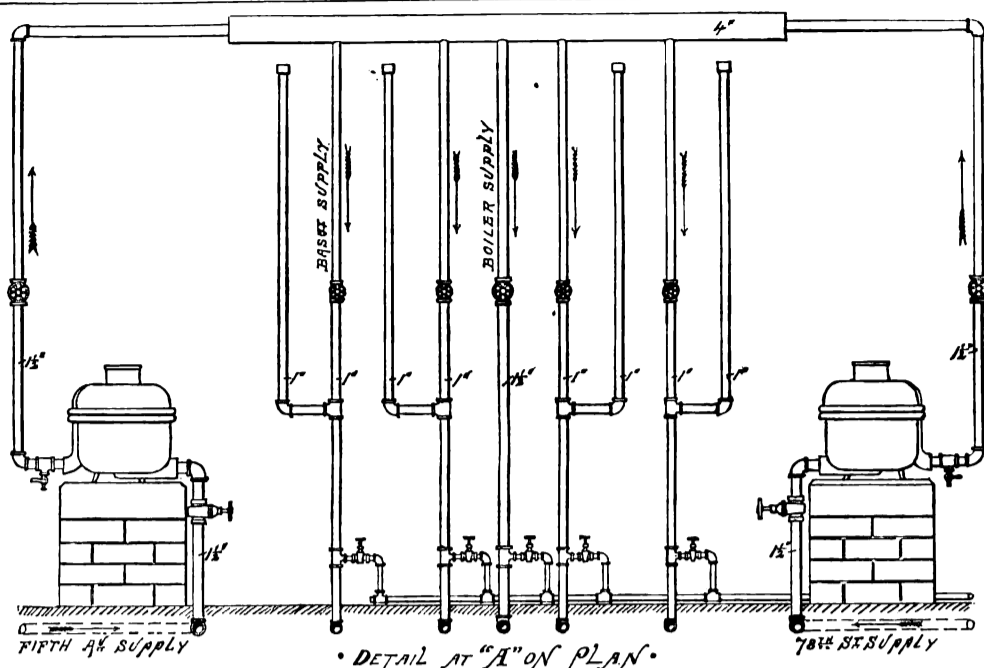


FIGURE 3.

form the finished floors of the billiard-room, kitchen, and laundry, and other basement-rooms which are finished. The rain-water leaders all enter the regular house-system of drainage, with traps immediately inside the house-walls, so arranged as to be easy of access. Figure 2 is a detail of the means provided to reach the hand-holes of the traps of the rain-water leaders and hand-holes of other traps beneath the basement floors. At the positions marked B on the plan (Fig. 1), and at all other corners or ends of lines, similar arrangements are used for peep and cleaning holes. The rain-water leaders are brought into the house-drains in the positions intended to be the fittest for the flushing of all parts of the drains. There are two fresh-air inlets, one in the outer wall of the Fifth Avenue area and the other in the area at Seventy-eighth Street. The sewers at these points are each six inches in diameter and the air-inlets five inches. All the house-drains and sewer-pipes, as well as such back-air pipes as are not of wrought-iron, are of extra heavy cast-iron. The heads of all the rising-lines, as well as the back-air lines, are run alongside the roof-rafter to one point near the apex, where they are all connected into a copper hood of large area, whose opening to the outer air is turned downward.

The water-supply is taken from both the Fifth Avenue main and from that on Seventy-eighth Street. The object of this is to be able to take water from either streets should the water in the mains of one of the streets be shut off. The pipe from each source of supply, after passing the service-cock, is one and a half inches internal diameter, and is AAA lead as far as the position marked A on the plan. Here the different services pass through their respective meters, the mode of distribution from this point being shown by Fig. 3, which is a detail at A on the plan.

The water, after passing the meter that may be in use at the time, passes to a 4-inch brass header, as shown; thence it is distributed downward through brass pipes, to get it underground once more, to join with lead pipes of the same diameters, for distribution to the principal parts of the house; one of the objects of putting it underground being to keep it at a lower mean temperature than could be obtained by running it on the ceilings through the basement.

The order of the pipes in the detail corresponds to the order in the plan, and may be traced to their point of delivery thereon. The centre pipe (one and a half inches) is for the main kitchen boiler-supply only. The basement-supply, as well as supplying water to the basement fixtures, furnishes a "Riker" gas-pump with water, to be forced to a tank in the top of the house at times when it will not rise there, for a high-pressure or tank supply. The other three pipes run to the principal divisions of the house, to supply the fixtures with cold "Croton" water as high as it will rise. Air-chambers are used on these pipes near the stop-valves in the position shown, their object being to prevent water-hammer at these ends of the pipes as is supposed likely to be caused by the reaction of the flow and column when suddenly checked, although there are air-chambers at the heads of the lines and ends of the principal branches.

The cold "Croton" supply is carried as high as the third-floor fixtures, which it reaches at nearly all times, the

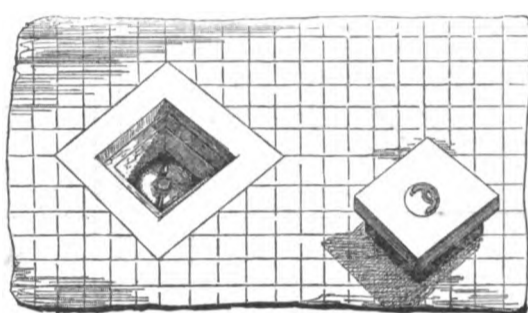


FIG. 2.

pressure in the night being sufficient to fill the tank in the attic without pumping.

The cold tank-supply for the second, third, and fourth floors is carried from the tank downward to the basement, thence it is distributed and run to the different rising-line recesses, up which the cold and hot supplies are also carried to the lines of fixtures.

Diagram, Fig. 4, shows the hot-water distribution from both the street-pressure and tank-pressure boilers, commonly known as "Croton-boiler" and "tank-boiler." These pipes are all carried just beneath the basement ceiling on specially contrived hangers, and may be seen in the kitchen sketch, Fig. 5. The diagram, Fig. 4, is the facsimile of a sketch made by Mr. Alexander Farmer, foreman for Mr. Muir, before the work was commenced, for the purpose of illustrating the principle to be followed by the workmen, and a comparison of the same with the finished work as shown in the kitchen (which is drawn from a photograph) will go to show how closely the original plan was carried out.

A double boiler is used, as shown in the diagram, the high-pressure or tank-boiler being inside the low-pressure or street-supply boiler, from which it receives heat in the usual manner. To a plumber it is not necessary to analyze the diagram, but for other readers who take a general interest we will outline the course of the water through the different pipes. The "street-supply" in diagram, Fig. 4, is the continuation of the "boiler-supply" in Fig. 3, and is the (cold) street-supply to the low-pressure or outer boiler. It enters the boiler at the upper end, the water being carried down within it through a supply-tube. A branch of the street-supply is also carried to the inside or tank-boiler, but does not enter it direct, connecting with the tank-supply at the nearest point. The object of this connection is to insure the filling of the inside boiler with water from the street service, should the tank become empty from any cause. To prevent the tank-water from running backward through this connection the check-valve shown is provided, which valve will open upward and let the water pass when the pressure in the tank-pipe is less than in the street-pipes. A check-valve is also used in the street-supply to the outer boiler, to prevent the emptying of this boiler through an empty main should the latter be drawn out. The two stub-pipes shown at the left are the pipes which maintain the primary circulation between the outer boiler and the water-back of the range. The second circulation

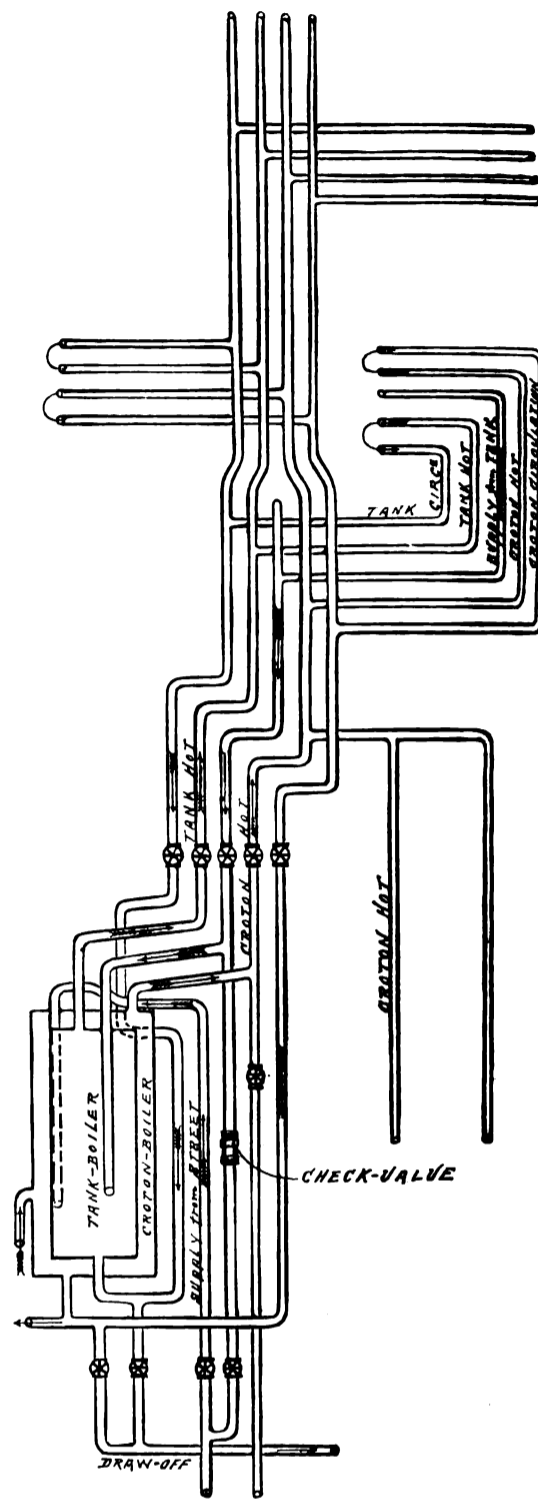


FIG. 4.

is through the "Croton hot" main pipe (see diagram) from the top of the outer boiler to the different branches, and the lines of fixtures to a point just below the "cut-off" in a line (which will be illustrated hereafter). From this point it returns through the "Croton circulation" to enter the water-back and boiler again, as may be seen by tracing it downward in the direction of the arrows. The third circulation is through the "tank hot" main, whose branches are carried to the higher stories, from which the "tank-circulation" returns from a point above the "cut-off," and enters the inner boiler again by passing through the bottom of the outer one, as shown.

Figure 5 shows the interior of the kitchen. The walls and ceiling are white marble slabs, about four feet square, set with plaster of Paris, and held in position with brass rosettes, which form heads or nuts to tap-bolts which fasten with the iron joists and to expansion-bolts in the walls. The floor is of small white ceramic tiles, laid in cement upon a concrete bottom, as before mentioned.

Between the boiler and the range, and also under the sink, will be noticed positions in the floor where hand or peep hole covers to the house-drain are placed, such as are shown in detail in Fig. 2. The sink is of very heavy white earthenware, with the back supported on a marble cleat, and the front resting on brass, nickel-plated legs. Otherwise it is as plain as possible, with no place for lodgment of dirt. All the pipes shown are seamless brass and tinned, with nickel-plated fittings, valves, and hangers.

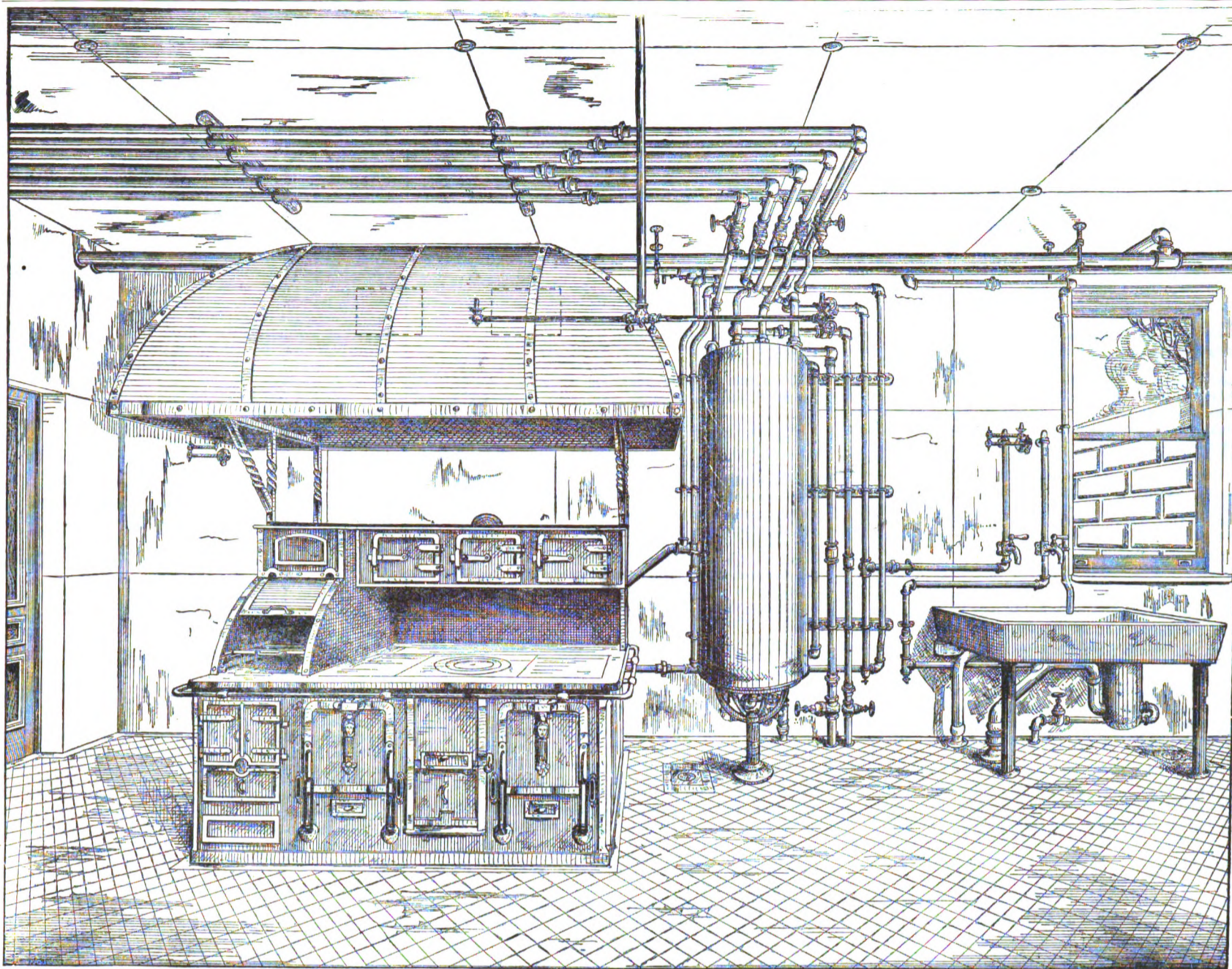


FIGURE 5.—INTERIOR OF THE KITCHEN.

Under the hood of the range are two vent registers, aggregating four square feet of area in the clear. They open into two chimneys 12"x20" each, which run parallel with and at each side of the range-chimney, which is of cast-iron, that the latter may communicate some of its heat to them.

One point worthy of special mention is the warming of a plate-closet in the butler's pantry by a branch from the primary or water-back circulation. It will be noticed that between the hood of the range and the boiler are two pipes, one starting from a *tee* close to the side of the boiler and the other returning into the circulation-pipe as it flows backward to the water-back. These pipes are the "flow" and "return" from a hot-water coil of about thirty feet lineal of $\frac{3}{4}$ -inch pipe which is placed within the plate-closet. It was the intention of the master plumber to take the flow-pipe from the head of the boiler instead of from the primary circulation-pipes; but fearing that should any considerable quantity of water be drawn from the boiler it would cool the coil also, he changed it to the *tee* in the pipe, as shown, in which position it warms the coil shortly after the fire is started and before the boiler is very warm, giving a constant temperature of about 180° at the coil.

(TO BE CONTINUED.)

HARDENING OF CEMENT.

M. PERRODIL has recently published in the *Annales des Ponts et Chaussées* the results of a series of experiments on the hardening of Portland-cement in air and in water. The cement, which was from Boulogne-sur-Mer, had the following composition in 100 parts after the complete removal of carbonic-acid and water: Silica, 23.8; quartz-sand, 1.3; alumina, 8.9; peroxide of iron, 2.0; lime, 63.6; magnesia, 0.4. The cement was mixed without sand, and made into cubes, which were either immersed in water or left exposed

to the air. From time to time samples were submitted to chemical analysis, and were exposed to the crushing test with the following results:

	CUBES EXPOSED TO AIR.			CUBES IMMERSSED IN WATER.		
	Per Cent. of Combined Water.	Per Cent. of Combined Carbonic-Acid.	Crushing Weight, Kilograms, per Sq. Centimetre.	Per Cent. of Combined Water.	Per Cent. of Carbonic-Acid.	Crushing Weight, Kilograms, per Sq. Centimetre.
After 1 day....	6.1	0	33.6	6.4	0	43.6
" 3 days....	6.2	1.8	84.0	8.7	0	119.2
" 7 days....	6.0	1.8	104.9	9.2	0	141.6
" 15 days....	8.0	1.0	122.8	12.8	0	163.4
" 1 month....	6.5	2.8	103.0	15.4	0	234.2
" 2 months....	7.6	4.0	123.8	14.6	0	293.4
" 3 months....	4.3	6.0	126.6	11.2	0	231.8
" 6 months....	8.3	5.8	171.6	15.3	0	329.6

It will be noticed that the samples plunged in water have, from the beginning, greater strength than those exposed to the air, and that the resistance to crushing increases with the amount of chemically-combined water. In commenting on these results, *La Semaine des Constructeurs* gives various theories which have been offered to account for the results, and says: "After all, these definitions and interpretations amount simply to saying that Portland-cement hardens when it absorbs and combines with water, because there are formed aluminates and silicates of lime, which have the property of hardening when they combine with water. As far as the theory goes we stand about where we did before; the important fact is that the water of hydration has a great influence on the hardening."

USE OF CARBONIC-OXIDE IN ABATTOIRS.

DR. RICHARDSON proposes to make use of carbonic-oxide to produce painless death in animals killed for food. The carbonic-oxide may be produced by passing air over a fire of charcoal, and the animal may either be bled as soon as anæsthesia is effected or may be exposed to the atmosphere until asphyxiated. Dr. Richardson asserts that it is a mistake to suppose that even five per cent. of carbonic-oxide is at once fatal to all warm-blooded animals. It may be true of some kinds of animals, but others can support for some time an atmosphere containing five times this proportion. The use of carbonic-oxide is not proposed for beef-cattle, the method now used being satisfactory.

SEWERAGE OF COPENHAGEN.

THE construction of the present sewers of Copenhagen began in 1860, and is still going on. With few exceptions all parts of the city now have sewers. It is a gravity system, discharging into the harbor at a number of different points. English water-closets are only permitted as exceptions. The amount calculated for is 180 litres per minute per hectare, and the grades are arranged to give a velocity of 0.785m. per second. The minimum rainfall allowed for is 6,500 litres per minute per hectare. There are overflows for heavy rains. The dimensions of the earthen pipes employed are 0.15m., 0.23m., 0.30m., 0.38m., 0.46m., and exceptionally 0.53m. To the end of 1883, 27.7 kilos of masonry sewers and 76 kilos of pipe sewers have been laid. As a rule faecal matter cannot be discharged into the sewers. The excreta are removed by a private corporation.

THE average daily consumption of water in Edinburgh, Scotland, in August was 13,243,000 gallons, equal to 39.06 gallons per head of population.

CHECKING WASTE OF WATER IN BOSTON.*

THE present board early realized that the prevention of waste was one of the most important and difficult problems with which all large water-consuming communities are obliged to contend. It is conceded by all experienced observers that at least 40 per cent. of the water supplied to large towns and cities is willfully wasted. The majority of people seem to be possessed of the idea that water should be supplied as free as air, and hence all idea of economy in its use seems to be banished. Restrictive measures have seldom been applied in our country; and the result is that everybody has become extravagant and wasteful.

We stated in our report of September last that the enormous wastage constantly taking place had been brought to the attention of the City Council every year since 1852, but that practically nothing had been done to remedy it. The Joint Standing Committee on Water, in its report of April 30, 1883, urged that immediate measures should be taken to stop this waste and reduce consumption. We believed that the consumption should be reduced from 95 to at least 60 gallons per capita, and that if this could be done a very large amount of money would be saved to the taxpayers of the city. We accordingly organized early in July, 1883, the Division of Inspection and Waste. The work accomplished by this division last year was of very great importance to the city; indeed, without it we should have been compelled to cut off the supply during a part of the severe drought of last year from a considerable number of our citizens. The tabulated results of the labor of this division appear in our reports of September and December last, and in the appended report of Superintendent Cashman. This report confirms the correctness of the judgment and policy of the board, and shows that continuous systematic inspection is an essential element in the prevention of the wanton waste now so prevalent in all large communities. Under this inspection the premises and fixtures of every water-taker have been visited several times during the year, the leakages stopped, the defective pipes and apparatus repaired, and the people taught to respect and obey the city ordinances with reference to the prevention of waste.

During a part of the present year, since the date of Mr. Cashman's report, the Deacon system of waste-detection has been in operation in conjunction with the house-to-house inspection, and up to the present writing, September 1, the results have been very satisfactory.

SUDBURY AND COCHITUATE WORKS.

	1884.		1883.		1882.	
	Daily average consumption.	Gallons per head per day.	Daily average consumption.	Gallons per head per day.	Daily average consumption.	Gallons per head per day.
January.....	34,162,300	88.4	34,715,500	92.9	32,151,100	92.9
February.....	24,598,000	67.5	32,690,700	102.2	34,652,300	102.2
March.....	23,711,900	65.0	34,110,700	94.1	32,656,300	94.1
April.....	21,505,700	58.8	30,617,600	88.6	30,827,000	88.6
May.....	23,788,500	64.6	32,169,500	82.3	30,738,400	82.3
June.....	26,184,600	71.2	33,419,200	94.8	33,178,400	94.8
July.....	25,409,000	68.9	36,774,000	102.4	30,092,600	88.5
August.....	25,652,200	67.7	37,141,000	97.3	34,149,300	97.3
September.....	.....	.....	33,645,600	90.0	31,691,600	90.0
October.....	.....	.....	29,575,800	81.9	31,553,800	81.9
November.....	.....	.....	30,174,000	83.0	31,138,700	83.0
December.....	.....	.....	.....	.....	32,352,300	91.4

MYSTIC WORKS.

	1883.		1884.	
	Daily average consumption.	Gals. per head per day.	Daily average consumption.	Gals. per head per day.
January.....	8,369,600	97.3	8,019,100	92.2
February.....	7,714,650	89.6	6,349,500	72.9
March.....	7,737,300	89.8	6,337,100	72.7
April.....	6,171,150	71.5	5,242,100	60.1
May.....	6,319,100	73.1	5,800,000	66.4
June.....	6,912,550	80.0	6,245,600	71.5
July.....	7,397,550	84.5	6,312,300	72.1
August.....	7,261,500	83.9	6,028,400	69.5
September.....	5,846,300	67.4	.....	.....
October.....	5,497,250	63.4	.....	.....
November.....	5,930,600	68.3	.....	.....
December.....	6,771,500	77.9	.....	.....

*From the eighth annual report of the Boston Water Board for the year ending April 30, 1884, but including the operations for checking waste up to September 1, 1884.

The tables show the daily aggregate and per capita consumption in the Cochituate and Mystic departments for the first eight months of 1884 in comparison with the corresponding months of 1883, this period being covered by the present system of inspection; and also a statement of the average daily consumption for several months prior to the beginning of the work of inspection.

These tables show the daily average consumption in the Cochituate supply from January 1, 1883, to September, 1883, to have been..... 33,954,775 gals.

And for the corresponding period of the present year, under the inspection system..... 25,293,150 "

A net daily average reduction of..... 8,661,625 " or about 26 per cent. saving.

In the Mystic Department, for the same period in 1883, the average daily consumption was..... 7,224,175

And for the corresponding period in 1884..... 6,299,262

A net daily average reduction of 13 per cent., or..... 924,913 "

Making a total average daily reduction..... 9,586,538 "

It is computed that the actual cost to the city for each 100 gallons of water furnished is about 1.5 cents, and upon this basis the reduction in consumption represents, in round numbers, the sum of \$1,200 per day during the first eight months of 1884. Again, it will be observed that in the months of July and August, which may properly be cited at this writing, the Deacon system being in full operation, the consumption was reduced 34 and 36 gallons per head each day for those months respectively.

It may be interesting to make a single comparison between the consumption of 1882 and 1883, when no special efforts were in progress to economize the supply.

The daily average consumption in the Cochituate supply from January 1, 1882, to September of the same year, was..... 32,116,288 gals.

And for the corresponding period in 1883 it was..... 33,920,422 "

Making an increased daily average consumption of..... 1,804,134 "

In the Mystic supply the daily average consumption for the year 1882 was..... 6,574,400 "

The daily average for the first eight months of 1883 (being the non-inspection period) was..... 7,224,175 "

A net daily average increase of..... 649,775 " And the net daily average increase of 1882 over 1881 was..... 330,300 "

The daily average consumption in the Mystic for the first eight months of 1883 (the non-inspection period) was..... 7,224,175 "

And for the last four months after inspection began..... 6,011,412 "

A daily average reduction of..... 1,212,763 " The average consumption per head per day for the year 1882 (discarding fractions) was..... 89 "

And for the non-inspection period of 1883, eight months, from January to September, it was..... 92 1/2 "

For the corresponding period of 1884..... 69 "

Showing a net average reduction of 20 gallons per head in 1884 over 1882, and 23 1/2 gallons over 1883.

The large decrease in consumption materially lessens the cost of pumping, the saving in coal at the Highland pumping-station alone being 35 per cent. for the first eight months of 1884 over the corresponding period of last year.

These results demonstrate beyond question the wisdom, as well as the necessity, for the adoption of measures to check the prodigal waste which prevails. Unless some radical system be adopted, which will keep the consumption down to 60 gallons or less per capita, the taxpayers of Boston will be compelled, at a very early day, to expend several hundred thousand dollars in the erection of additional reservoirs, and several millions of dollars in obtaining a new source of supply. The city of Providence, with relatively the same industrial interests and class of people as our own community, keeps her consumption down to about 36 gallons per head per day. That of Boston for July, 1883, was 102 gallons per head each day, and in July of the present year, under the inspection system, 69 gallons per head. It will be observed that, even with this great reduction of the present year, we are still using nearly 100 per cent. greater amount of water per capita than our more prudent neighbor. In Providence, however, more than 50 per cent. of her consumers are supplied by the meter or measurement system, while with us scarcely 10 per cent. are supplied by this method. Providence is, perhaps, the only city in the United States which has undertaken to manage its water interests with the same reference to business principles that prevails among business men everywhere.

In connection with the house-to-house inspection system, and as a necessary supplement thereto, the board adopted the policy recommended in its December report, as follows:

- 1st. To put recording meters on all manufactories, breweries, stores, business establishments, hotels, tenement-houses, and all other places where a large quantity of water is used, or where waste prevails.
- 2d. To establish Deacon waste-detectors in the residential portions of the territory supplied with water, making specific districts, and doing the work in conjunction with the house-to-house inspection.

3d. To begin the putting in of sidewalk stop-cocks at once, adopting the Church stop-cocks as the best complement to the Deacon, if the further trials continue to prove its excellence.

Recording-meters have been applied in accordance with this original plan. The meters used have been largely those of the Tremont pattern. They have been delivered as fast as the city could use them, and have proven generally satisfactory both with reference to workmanship and accuracy.

The Deacon system of waste-detectors is at this writing (September 1) fully applied to the Cochituate Department. This system was thoroughly tested in the Mystic Department in 1882, by Assistant Engineer Dexter Brackett, and was recommended by Mr. Henry M. Wightman, the engineer of the board, and Alderman Greenough, the Chairman of the Water Committee, before the present Water Board was appointed. To these gentlemen should be given in large part the credit of introducing this very efficient system into Boston. We now have some seventy-five of the Deacon detectors in operation, and the work being done by them is of a satisfactory character.

The board was directed by the City Council, on the 10th of December, 1882, to make an examination of the merits of the Church stop-cock, and a very thorough series of tests were made last year under the supervision of Assistant Engineer Dexter Brackett, and a full report of the same appeared in the report of December 6, 1883, page 40. Since that time Mr. Henry M. Wightman, engineer of the board, has made various experiments with this stop-cock, and several important changes have been made in it as the result of his suggestions. The inventor, Chief Engineer B. S. Church, of the New York Aqueduct Commission, has also made a very valuable addition to the instrument, by means of which the particular floor upon which the water may be leaking or running is indicated on the dial attached to the stop-cock in the sidewalk. The board has been conducting tests and experiments with this invention for more than twelve months, and is satisfied that it is the best stop-cock for general purposes and waste-water detection combined. No city or town having a water-supply should be without a complete system of sidewalk stop-cocks. Every service applied in Boston for the past few years has been accompanied by such a stop-cock. The failure of our water authorities to apply them originally was a grave mistake, and one which no other large community save New York has committed. The plan of the board is to gradually apply these instruments until the city has its full complement. At this writing the Church stop-cock has been adopted by the board, and 5,000 of them have been ordered. The necessity of the early application of sidewalk stop-cocks was presented in our report of December (page 48), and has frequently been urged by Engineer Wightman.

We have also made extensive experiments with the Bell waterphone, which has been used very successfully in Cincinnati and Philadelphia, and is about to be introduced in New York. Our experiments, however, were not successful, for the reason that, in the absence of sidewalk stop-cocks, wires were used to connect the waterphone with the service-pipe, and the results were unsatisfactory. We contemplate giving this system another trial at an early day, in the Mystic Department, where sidewalk stop-cocks exist, and where the same conditions will obtain as in other cities in which it has met with success.

It is a matter of frequent complaint that the system of house-to-house inspection established by the board is annoying to water-takers; the frequent visitations of inspectors to premises of water-takers are looked upon as a system of espionage. There may be some measure of truth in these complaints, but there is no present remedy. There is but one other large city in the country so deficient in sidewalk stop-cocks as Boston; and until these are generally applied and the recording-meter service largely extended, we must continue the house-to-house inspection system, or submit to the prodigal waste which has heretofore prevailed. There is no middle ground. People will not repair their defective fixtures, and will not stop wasting water unless compelled to do so by official visitation, or by the adoption of a measurement system which will oblige them to pay for all the water used.

Our inspection corps is composed of gentlemanly officials. Each officer is provided with a badge, which must always be worn in sight when on duty, and a commission which he must exhibit on demand. We have frequently had the whole corps of inspectors before the board, specially to instruct them with reference to these matters. Whenever complaints are made in this direction the board causes them to be thoroughly investigated, and prompt action is always taken. The board has used every precaution to insure courteous treatment to the water-takers and secure efficient results to the city. This system, vigorously followed up, will prevent a large part of the daily waste; and no other method will accomplish it except the recording-meter or measurement system. When this is applied, and people are required to pay for water as they do for gas, they will not waste it. The meter or measurement system could not be universally applied to Boston except at a very large expense, and even then it would require several years.

Recognizing these difficulties the board adopted the only feasible plan of reducing the consumption, that of an efficient house-to-house inspection; and the results have justified its action.

THE Rochester, N. Y., *Democrat and Chronicle* is authority for the statement that the sewerage of that city is in a confused and irrational condition, and that small shallow sewers are constructed from time to time without a well-defined plan, on bad grades, and sometimes with the main sewers smaller than the branches.

ELECTRIC-LIGHTING EXHIBITS AT THE INTERNATIONAL ELECTRICAL EXHIBITION.

No. III.

(Continued from page 535.)

THOMSON-HOUSTON SYSTEM.

ONE of the peculiarities of this system is the use of both arc and incandescent lamps in the same circuit, which is shown in actual operation. It is claimed to work well, whatever the distance of the incandescent-lamps from the generators and regardless of their position in the circuit. The Thomson-Rice incandescent distributor is employed to regulate the current, ten 12-candle-power incandescent-lamps requiring the same power as one 2,000-candle-power arc-light.

This company is now making its own incandescent-lamps at its factory at Lynn, Mass. The 12-candle-power size is mostly used at present. The globe is spherical, and the carbon consists of a single loop, like the Edison in shape. It is made of cotton, two or three fine threads being twisted together, soaked in a solution of sugar, carbonized in crucibles, and afterward treated by a hydrocarbon-vapor process for equalizing the resistance. The potential of these lamps is said to be forty-four volts. About sixty arc-lights are shown in operation. Those exhibited in its own space are mostly 1,200-candle-power, but those on two roof arches and a row outside the building are 2,000-candle-power. The arc-lamps contain automatic arrangements for feeding the carbons properly, so as to secure a uniform light. Some also contain magnetic cut-outs for extinguishing the light when a carbon sticks, resulting in the production of sparks, which would be dangerous among material easily set on fire, as in dry-goods stores.

The Thomson-Houston dynamo is peculiar in having an "air-blast" on the commutator to blow back the sparks produced, thus allowing the use of oil; also being mounted in free air, insulation is done away with, cleaning is seldom required, and but one armature is necessary.

Among other interesting exhibits of this system are half-size lamps for use in the same circuit with full-size; a rapid transfer switch for circuits; a safety-locking switch; a vacuum cut-out; a "film" cut-out; and a converter for changing a high-tension current to a low-tension for incandescent illumination. The latter is accomplished by running the current through a machine, acting as a motor, turning another machine on the same shaft, which latter machine is so wound as to give very low tension.

(TO BE CONTINUED.)

PLUMBERS' CONGRESS AT THE INTERNATIONAL HEALTH EXHIBITION.

No. I.

(From our Special Correspondent.)

LONDON, October 21, 1884.

A CONGRESS of considerable importance has been held at South Kensington, at the exhibition buildings, during the past two days. The British plumbers are at last awakening to the fact that, in their own and the public interest, steps should be taken to improve their business and their standing in the community by the severance of the tares from the wheat in their numbers. Among the ancient guilds of London that of the plumbers has, it is true, always held a place. A traditional ordinance of Edward III. (dated 1365) is quoted in connection with its history to the effect that "none shall meddle with works touching such trade, except by consent of the best men in such trade, testifying that he knows how, well, and lawfully, to do his work, so that said trade may not be scandalized, or the commonalty damaged." Unfortunately for a considerable period the guild has been of little service in the direction indicated above, or indeed in any other direction, unless, perhaps, in the shape of banquets and bequests to a few pensioners, sharing thereby the fate of most of the old guilds. During the past two or three years, however, it seems to have been entering a new phase of its existence. The present master is Mr. George Shaw, who bears the reputation of being a master plumber in every sense of the word, and it is chiefly by the efforts of this gentleman that the guild seems likely to revert to its original standing. It is also largely due to his labors that the present congress was held, and if a large and representative meeting of plumbers, London and Provincial is any index of results likely to accrue, then Mr. Shaw and his friends have every reason to congratulate themselves and be congratulated. With a view to putting matters on their widest and most solid basis, the co-operation of medical officers of health, boro' surveyors, and architects was also invited. The

agenda paper put forward eight clauses for discussion. It is a moot point whether No. 5 would not have been better omitted; it opened up the way to the discussion of every one's particular "fad." Lead, iron, and zinc cisterns, Brahmah and wash-out closets, and iron soil-pipes were each abused and upheld, while *D-traps* and *pan-closets* found a few courageous supporters. To the credit of the British plumber, let it be added that the party upholding these antiquities was very small. It is, however, a pity that anything tending to take away the discussion from the broad basis of the question should have been admitted. The agenda was as follows: 1. The technical instruction of plumbers. 2. Apprenticeship, the duration and condition of indentures suited to the present state of the plumbing trade and to the modern system of technical instruction. 3. The establishment of metropolitan and provincial boards of examiners of plumbing-work. 4. The registration of journeymen plumbers. 5. The suitability of materials used in plumbing, and particularly of those materials recently introduced as substitutes for lead. 6. The desirability of fixing upon a system by which uniformity in the quality of material used in plumbing may be insured. 7. The formation of district associations of plumbers to investigate and secure, as far as practicable, correction of evils and abuses arising in connection with the trade. 8. A general and executive committee to be formed for the purpose of receiving reports from district associations of plumbers and others, with a view to the preparation of a general report by the Plumbers' Company, to form the basis for an appeal to Parliament for necessary amendments and extensions of the law relating to plumbers' work under the Building and Health Acts, and otherwise.

It will be noticed that technical instruction occupied the first place in the discussion, and the consideration of this subject resulted in a unanimous *consensus* of opinion among speakers and listeners that methodical technical education under practical teachers is all-important and should in every case go hand-in-hand with the workshop course. The existing state of things as regards inspectors of plumbing-work (so far as it goes, which is not far) came in for criticism and a decision as to necessity of alteration. The relationship of architects and plumbers, and the fact that there is little or no consultation and support, at all events in the majority of cases, was also touched upon, and the necessity for alteration in this direction insisted upon. The continuance of the apprenticeship system, modified in such a manner as to suit the present conditions, was favorably recommended. The period during which the apprenticeship should exist was the knotty point, terms of from five to ten years being all warmly urged. The diversity of opinion as to the advisability of registration of plumbers was very great. There would seem to be much misconception on this head, many of the speakers being apparently under the impression that there was something derogatory in such a step, and that the registered plumber would have to take his certificate around to every job and get it indorsed by the employer. One of the speakers informed the meeting in reply to certain quotations made from THE SANITARY ENGINEER that the registration of plumbers was a thing which would never come to pass; that Englishmen would not stand it, and that the system had not worked well in America. As another speaker, however, very pertinently remarked, such a step was in the protection of good workmen; members of the medical profession after passing through their course of study had to take a diploma, and "if they started a shop," were proud of showing the certificate and using the letters M. R. C. S.; why then should not a licensed practitioner in the plumbing profession be proud of his certificate, and the letters L. P. (licensed plumber)? Experience in England and America is, of course, very similar in many directions, and Americans, therefore, will have a fellow feeling with Mr. Scott Moncrieff, the engineer of the North British Plumbing Company, when he called attention to a hardship upon the plumbing fraternity here, which has frequently been commented upon in the columns of THE SANITARY ENGINEER as a source of evil and danger in America—namely, the habit of including plumbing-work in the builders' specifications and contracts. This was so immediately appreciated that the chairman, Mr. Shaw, put a resolution to the congress that "in future architects should not include plumbing-work in building contracts," a resolution which was supported by Mr. Penrose, the present architect of St. Paul's Cathedral. The progress of the discussion ran very much on all fours with that familiar to American readers in their difficulties on the same subjects. It will further be gratifying to American readers to know that Mr. Ernest

Hart, who read the opening paper, recounted the progress of the agitation and legislation for plumbing regulation in America, and referred in most complimentary terms to the services rendered by the editor of THE SANITARY ENGINEER to the plumbing fraternity, and the cause of health generally, the reference to that gentleman being warmly recognized by the meeting. Particularly able papers on the advantage of technical education were read by Mr. Eassie and Mr. J. W. Clarke (the gold medalist with honors for the guild's examination), which will be treated in common with the other papers at an early date.

(TO BE CONTINUED.)

DUBLIN HEALTH EXHIBITION, 1884.

(From Our Special Correspondent.)

DUBLIN, October 18, 1884.

It is questionable whether the Sanitary Institute acted wisely in holding the usual Health Exhibition in connection with the Congress this year, even though that Congress was to be held "across the water" at Dublin. The present has been, and is, a year of exhibitions, and exhibitors cannot but like other business people feel the strain of the constant expenditure consequent.

The following firms were among the exhibitors:

Doulton & Co., Lambeth, London, Eng., showed both decorative and constructive articles, the former in the shape of the well-known Doulton-ware tiles, filters, jugs, etc., and the latter in closets, flush-tanks, lavatory-tops, brass-work, drain-pipes, etc., automatically flushed trough-closets and urinals. A new feature in the construction of the trough-closet shown was its circular construction, similar to an ordinary drain, to obviate the chances of breakage by a blow or kick, and its short sections, enabling the replacement of a broken section at small cost, or the extension to any length required.

William Baird, 27 Lower Abbey Street, Dublin, has a conspicuous exhibit of baths, lavatories, closets, flush-tanks, hydraulic rams and turbines, plumbers' brass-work, etc. A novel form of automatic flushing-cisterns for urinals, closets, etc., is shown, in which the syphon is started by the tipping over of a small tumbling-tank supplied by a weeping-cock. A new form of opening the waste of lavatory-basins is also shown, in the shape of a pull through the back upright plate of the lavatory-top, a counterpoise being so hung that the "pull" maintains its position when drawn out, until it is again pushed back to close the waste.

A. T. Angel, 144 Fulham Road, London, Eng., exhibits his specialties of air-tight manhole covers and grease-traps.

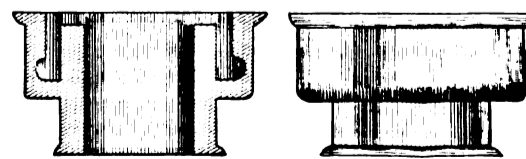
The Hygienic and Sanitary Engineering Co., of 23 and 24 Charing Cross, London, Eng., exhibits the new form of Bostel's Excelsior water-closet, the alteration being in the direction and force of flush.

John L. Smallman, 23 Temple Lane, Dublin, exhibited specimens of galvanized-iron cisterns, water-closets, etc.

Parkes Museum of Hygiene, 74a Margaret Street, London, Eng., exhibits publications, specimens of old lead-work and bad joints.

Baird, Thompson & Co., 24 Bath Street, Glasgow, Scotland; P. Daniel & Sons, 44 Grafton Street, Dublin; R. R. Heap, Greenheys, Manchester, and the British Sanitary Co., of Glasgow, show specimens of earth-closets and commodes in their various forms. Baird, Thompson & Co. show, in addition, Watts' smoke-testing apparatus for drains.

Thomas Twyford, of Hanley, Stafford, Eng., has a very tasty show of lavatory table-tops and basins, ornamental, "National," "Crown," and other closet-basins, etc. A piece of exhibition work is shown in the shape of a handsome large oval white-porcelain lavatory-basin and inclosure, most elaborately ornamented in grolier-work in gold, the entire top being so decorated. There are also shown specimens of lavatory-basins with so-called "Atlantic" rim, for use on board ship. A projection inward runs all around the basin, with the object of preventing water from slopping over when a ship is rolling. A novelty in this stand of interest to plumbers is a rubber connection for patent overflow-basins, of which the following is a cut:



Its purpose is likewise to connect the nose of the basin with the supply-pipe.

J. & M. Craig, Hillhead Fire-Clay Works, Kilmarnock, Scotland, have an extensive show of table-tops, lavatory-basins, enameled sinks, Buchan grease-traps, closets, etc. The novel feature of the exhibit appears to be an earthen-trap for water-closets, in which the crown is flattened, providing an air-chamber, with a view to its not being easy to syphon out.

Maguire & Son, of 10 Dawson Street, Dublin, have a most elaborate and extensive display, occupying some ten per cent. of the available space on the floor of the exhibition. The exhibit is comprised of almost every article of house construction and adornment, from drain-pipes to ladies' fans and drawing-room "kickshaws." Among the sanitary specialties is shown an intercepting-trap, lined enamel in order to minimize, so far as possible, the chance of adhesion and soiling. A handsomely-fitted bath-room and lavatory is shown. We notice that the portion fitted up with urinals is floored with unglazed and absorbent tiles. This firm also shows Dr. Scott's disinfecting-chambers, heated by gas-coal. These chambers, about 6'x4'x4', are simply small rooms of iron, heated by gas-jets or fire on the floor, and provided with shelves for holding baskets containing the articles for disinfection. There is also shown a patent drain-pipe on chairs, with inspection-holes and covers in the pipes. Messrs. Maguire have fitted up the lavatory, etc., in connection with the exhibition in a tasty manner.

J. L. Bacon & Co., Upper Gloucester Place, London, Eng., show their system of heating on the small-pipe system.

J. E. Ellison, Leeds, Eng.; W. P. Buchan, Glasgow, Scotland; C. Kite & Co., Chilton Street, London, Eng., exhibit ventilators and cowls of various descriptions.

Murgrave & Co., Ann Street, Belfast, Ireland; Wentworth Erck Shankill Co., Dublin; J. Wright & Co., Broad Street, Birmingham, Eng.; E. Sydney, 191 New North Road, London, Eng.; Arden, Hill & Co., Constitution Hill, Birmingham, Eng.; Walter Carson & Son, 21 Bachelor's Walk, Dublin, and Wilson Engineering Co., London, Eng., exhibit heating and cooking stoves, and ranges in various forms.

The Bowtrehill Coal Co., Dreghorn, Ayrshire, N. B., show an assortment of porcelain sinks and wash-up tubs and baths.

Articles of dress are present in great variety; foods, "sanitary" whiskeys and wines, etc., are also well represented. Although in some cases foods are shown both in their natural and manufactured state, there does not seem to have been any attempt to present comparative analyses. Mattresses, bedsteads, and furniture are also shown, one enterprising firm striking out a new line by exhibiting *one suite of FUMIGATED oak furniture*, and there is the usual proportion of soaps and disinfectants. An interesting loan exhibit of plans, chiefly in connection with works in Ireland, was also on view.

Walter Carson & Sons, 21 Bachelor's Walk, Dublin, Ireland, exhibit non-poisonous and anti-corrosive paints.

The Willesden Paper Co., London, Eng., exhibits specimens of its manufacture for roofing and general construction.

The Pennycook Glazing Co., of 11 West Regent Street, Glasgow, Scotland, exhibits a glass house glazed with its patent form of glazing without putty.

Cordingley & Sons, Bradforth, Eng., exhibit specimens of granite concrete flooring for stables, cow-houses, etc.

C. Cadle, 39 Wellington Quay, Dublin, exhibits Leffel's double turbine water-wheel for pumping or ventilating purposes. It is claimed that with a fall of twenty feet this wheel will work to 22-horse-power. On the same stand are specimens of patent silicate cotton for covering boilers, etc.

P. A. Maignen, 22 and 23 Great Tower Street, London, Eng., exhibit their specialty, the Filtre Rapide (described as shown at the Health Exhibition, London, in our issue of September 24 last).

Thomas Bradford & Co., of Holborn, London, Eng., and Manchester, exhibit their various specialties in washing and drying machines. There is also on this stand the model of a disinfecting chamber for clothing, bedding, etc. A wrought-iron chamber, without floor, is suspended by pulleys and chains over four columns, acting as guides when it is raised or lowered; when lowered it rests in grooves on a cast-iron perforated flooring, under which is the fire-box. When the furnace is in action the heated air rises through the perforation into the upper chamber, and when the operation of disinfection is considered com-

pleted, the foul air is drawn into a flue communicating with the furnace, through which it passes before being liberated into the open air. They also show their drying-closet (referred to in our issue of September 11 last).

John Greenall, 105 Oxford Road, Manchester, and McDougall & Co., Port Dundas, Glasgow, also show specimens of washing machinery.

MECHANICAL ENGINEERS.

THE fifth annual meeting of the American Society of Mechanical Engineers was held in this city on the 5th to the 7th inst., inclusive, in the hall of the New York Academy of Medicine, at No. 12 West Thirty-first Street. The papers read were an address by President John E. Sweet; "Code of Rules for Conducting Boiler-Tests;" "The Experimental Steel-Works at Wyandotte," by W. F. Durfee; "The Original Bessemer Steel Plant at Troy," by R. W. Hunt; "Locks and their Failings," by A. C. Hobbs; "A Novel Form of Hammer-Die," by William Hewitt; "New Method of Constructing a Horizontal Tubular-Boiler," by F. A. Scheffler; "Sound Castings," by T. D. West; "A New Rock-Drill," by F. A. Halsey; "Measurements of Friction," by C. J. H. Woodbury; "On the Sliding Friction of Rotation," by R. H. Thurston; "Recent Improvements in Drawing-Boards," by Theodore Bergner; "Steam-Boilers as Magazines of Explosive Energy," by R. H. Thurston; "Factors of Evaporation for use in Tests of Steam-Boilers," by William Kent; "Experiments on Non-Conducting Coverings for Steam-Pipes," by J. M. Ordway and C. J. H. Woodbury; "Table for Calculating Areas of Chimneys," by William Kent.

On Friday (the 7th) a special train, furnished by the courtesy of the Delaware, Lackawanna & Western R.R., conveyed the members to points of interest in Paterson, N. J., including the rolling-mill, the Rogers and Cooke Locomotive-Works, and a silk-mill. Returning in the afternoon, the society visited the laboratories and workshops of the Stevens Institute of Technology, at Jersey City, N. J.

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

CONTROLLING GAS BY ELECTRICITY.

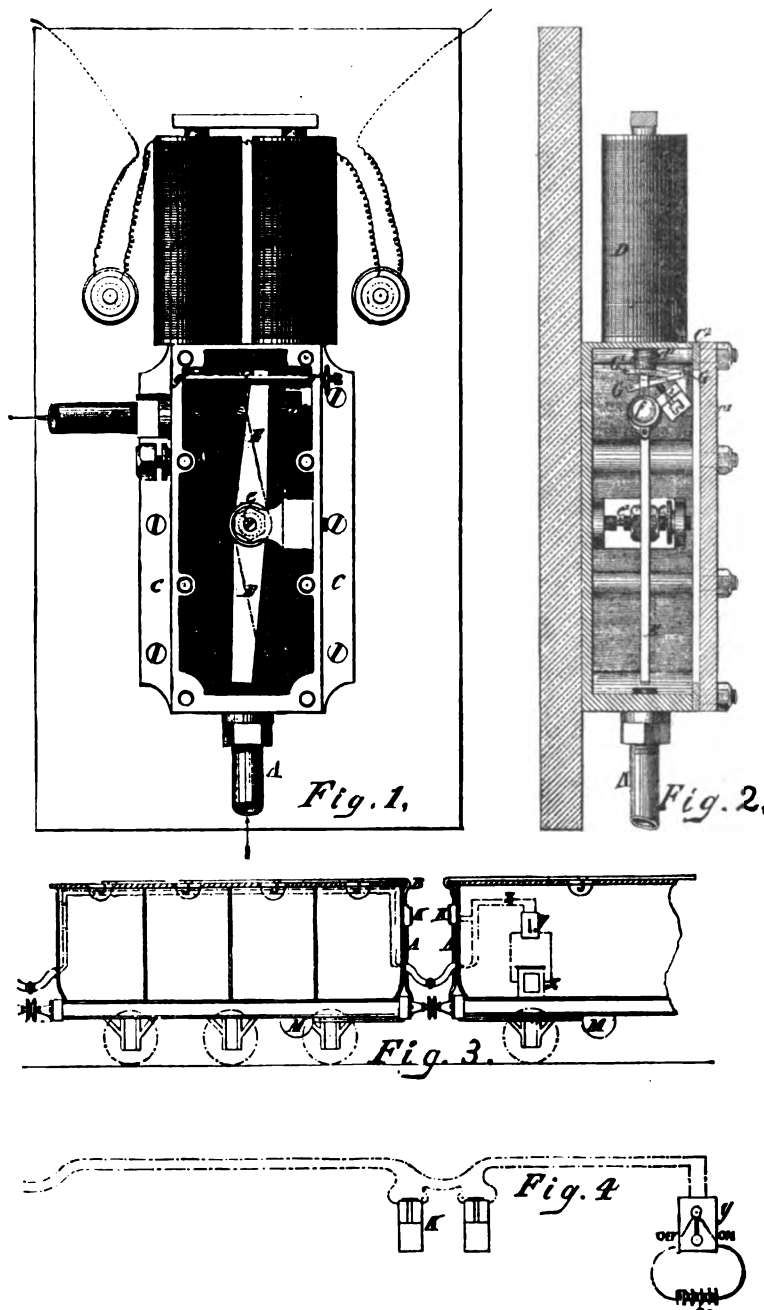
OUR illustration shows a novel method of regulating the supply of gas in railway trains by electricity. Its object is to economize in the consumption of gas, and put it within the power of the attendant, while in the guard's van, to vary the supply to the compartments of a train.

Figures 1 and 2 show the interior of the gas-controlling apparatus. A is the gas-supply pipe or tube from the cylinder or reservoir in which the gas is stored. B is the pipe or tube leading to the burners of the several lamps on the carriage. C is a case or box formed of a non-magnetic metal, or having that portion in contact with the electro-magnets so formed, or it may be formed entirely of wood, ebonite, or other non-magnetic material capable of withstanding the pressure of the gas which has to pass through it. D is an electro-magnet having its iron or steel cores or poles $d d^1$ carried through at the upper end of the box C, so as to leave no space for the escape of the gas. E is a bar of magnetized steel pivoted at e^1 within the case C, carrying upon its upper portion a pad or stop-valve f , which valve, when the magnet E is in the dotted position (Fig. 1), is so arranged as to close or nearly close the mouth or end of the tube B, or otherwise limit the supply of gas passing into the tube B from the box C. H H¹ are stops for limiting the movement of the bar E, the stop H¹ being a permanently fixed screw or pin, and the stop H being a screw adjustable at will. G is an armature locking-bar employed only when the cores $d d^1$ are formed of soft iron pivoted at $g g^1$, being composed of an ordinary armature of soft iron, having fixed upon it a brass bar, G¹, which, when the armature is uninfluenced by a current of electricity being passed through the electro-magnet, engages with the magnet E in such a manner as to keep it in one of two positions—viz., either as shown in full lines at Fig. 1 (open) or as shown in dotted lines (closed or nearly so). When a current, either positive or negative, is passing through the electro-magnet D, the armature G will be drawn up toward the cores $d d^1$, and carrying with it the locking-bar G¹ attached thereto, and will leave the magnet E free to move to one side or the other, according to the direction of the current. This instrument is fixed upon that end or portion of the railway-carriage most convenient to obtain connection with the tubes conveying the gas to the lamps of the carriage or van.

Figure 3 is a view of an ordinary railway-carriage, and in which M represents the gas reservoir or cylinder, A the tube or pipe leading from it, K the electrical gas-valve or stop-cock above described, and B the tube leading therefrom to the lamps.

In the guard's van is placed an electrical battery, x (Fig. 4), the two poles of which is connected to a reversing key or switch, Y, which switch is connected by one or two wires, Z, with each coach or vehicle fitted with the electrical-valve.

The inventor is Mr. William E. Langdon, Superintendent of Midland Railway Telegraph Department, Derby, England.



REGULATING GAS IN RAILWAY TRAINS.

Reviews of Books.

ATTACK AND DEFENSE OF COAST FORTIFICATIONS.
By Capt. Edward Maguire, Corps of Engineers, U. S. A. D.
Van Nostrand, New York. 1884.

A most useful book, showing the present tendencies of foreign governments toward the construction and armament of their naval fleets, and the progress of fortifications, with auxiliaries of torpedoes, torpedo-boats, and floating batteries for defense.

The information, so judiciously collated, shows careful research, and will be of the greatest interest to the general as well as to the professional reader. Nothing is omitted which is necessary for a clear illustration of the remarkable advance from the old to the new systems of attack and defense.

At the outbreak of the rebellion in the United States in 1861, our sea-coast defenses, which were masonry casemates, with their armaments in tiers, were the best of existing types, and challenged the admiration of the world; and our navy, though small, was composed of fleet wooden vessels, with beautiful models, and whose armaments were the equal of any afloat.

To-day our fortifications and navy are obsolete, both as regards the material of which they are constructed and their armament.

Captain Maguire, with an intimate knowledge of the subject, carries the reader through the entire range of fortifications, with frequent quotations from eminent authorities, home and foreign, from the old earthen battery to the new revolving turret for land defense; and of naval architecture from the wooden vessel to the modern turret ship, typified in the English "Inflexible," and in the Italian "Duilio."

Chapters 5, 7, and 8, respectively treating of "Obstructions and Submarine Mines," of "Armament of Coast Batteries," and of the "General Measures of Defense," are especially instructive. We cannot read them without a sense of our utter weakness in way of defense against even a second-rate power, and how essential it is that we should at once take active measures for the protection of our harbors, arsenals, and large commercial cities. We appreciate also, after reflecting upon the strength of foreign powers in their fleets of war-ships and torpedo-boats, how puerile must be our efforts of defense in case of attack, should we yield to the oft-repeated arguments of the ill-instructed public, and trust to provisional expedients for harbor defense, such as floating batteries, submarine mines, and like devices, to the abandonment of well-constructed fortifications and big guns, and a well-appointed fleet of war-vessels.

The freedom of our country from the disturbing influences of restless neighbors has rendered unnecessary the lavish expenditure of money incurred by foreign governments on experimental tests for resistance of metals, penetration of projectiles, and manufacture of guns; but the advance in military and naval improvements has been so marked in the past twenty years, that we can no longer remain idle, in view of the unprotected character of our harbors and cities. We must renew our fortifications and naval fleets, and in their reconstruction we have the results of the experiment abroad as a guide and example. The only requisite now is money, and this Congress should appropriate without further delay.

We must give up the idea that torpedoes and hastily constructed floating batteries alone can save our commercial cities in the event of war. They are only auxiliaries. To be safe we must have as a first requisite the heaviest guns that are made, and they must be so sheltered within secure retreats that even the richest possessor of fleets and heavy guns will hesitate before coming to a conflict with us. Our defensive measures, however, cannot be prepared in a day, nor in a year; but with the needed supply of money, the preparations may be made before the occasion for their use arises.

The work before us appears at a very propitious time, and we believe it will have an influence of the greatest good upon the intelligent public.

Though the author modestly suggests that his work is mainly for the "younger generation," who have hitherto been obliged to wade through many foreign books not often accessible to acquire the information here compiled, we think it will be found interesting by many laymen, and our national legislators at least could read it with profit.

L'ECONOMISTE PRATIQUE. Construction et Organisation des Crèches, Salles d'Asile, Écoles, Habitations Ouvrières. Bains, Dispensaires, Hôpitaux. Mécanisme, Statuts, Règlements des Institutions de Prévoyance et de Bienfaisance. Par Émile Cacheux, Ingénieur. 814 pp. 8vo. With Atlas of 71 plates. Paris, 1885.

As indicated by its title, this book treats of the construction and management of the habitations, schools, asylums, etc., intended for the poor and laboring classes. It is designed for the benefit of Paris, and discusses the various questions involved mainly with reference to the needs and circumstances of that city, but as the problem of properly housing and caring for the poor is in many respects the same in all large cities, our philanthropists, sanitarians, and architects will find that much of this work will interest and instruct them. The author states that as an owner of a number of tenement-houses situated in various parts of Paris he has had occasion to examine a number of the habitations of the working class, and finding them, as a rule, to be overcrowded and badly ventilated, he set to work to see what could be done to improve their condition. From personal experiments in building he concludes that it is possible to build houses suitable for workingmen at a cost of about \$1,200 each, and that these can be disposed of by a system of twenty annual payments, so as to produce a net profit of about five per cent. to the builder.

It is, however, only on the outskirts of a large city that land can be had at such a price as to permit of the building of these single small houses, and, therefore, although such houses are undoubtedly the best for the health and morals of those who can afford to occupy them, there will always be a necessity for large houses of several stories, each accommodating a number of families. Taking five per cent. as the net profit which the owner should derive from letting such lodgings, he concludes that this can usually be obtained by a rent amounting to eight per cent. of the cost of such houses, and urges that the Government should expend six millions of dollars in constructing such dwellings.

The forms of contract and regulations governing the renting of these dwellings are given in detail.

The possibility of attaining the same end through the action of voluntary associations, whether actuated in part by philanthropic motives or dealing with the matter as a co-operative building association, managed on strictly business principles, is also discussed, and copies of the constitution and by-laws of such a society are given, together with a number of forms and documents of interest.

The second part of the work treats more especially of the excessive mortality among the infants of the poor, and of the institutions due to public or private beneficence, whose object is to diminish this mortality and increase the number of strong and healthy citizens in the State. This includes foundling and infant asylums and schools. In this section several important reports of Government commissions are given.

The third section of the work treats of the food of the laboring classes, and of cooking-apparatus for large establishments, of baths, and wash-houses, or public laundries, and of co-operative societies and associations among the working classes.

The fourth section is devoted to a consideration of the best means of practically assisting the poor and dependent classes, including almshouses, dispensaries, hospitals, night refuges, etc., etc.

The atlas of plates which belongs to the work contains a large number of plans and illustrations of the various classes of buildings referred to in it, and also of furniture and apparatus, and the whole forms a sort of encyclopædia for the practical philanthropist. Within the limits of a notice of this kind criticism is out of place. Our object is to call attention to it as a very interesting and valuable collection of official reports and documents of various kinds, but all being directly practical in character, and all bearing on the main point—viz., the improvement of the condition of the poor.

It is destined to be an important work of reference and as such we commend it to our readers.

NOTES.

THE River Medway, in England, was polluted by the refuse of certain oil-mills at Tovil, and lower down the river the sewage at Allington was being deodorized by lime before being turned into the river. Some time ago the mill-owners obtained permission to discharge their refuse into the sewer. The result was that the sewage was deodorized by the chemicals in the waste,

and further treatment was deemed unnecessary. Lately, however, complaints have been made of the effluent, and the local board has decided to return to the former system of deodorization by the use of lime in tanks.

THE Chief Engineer of the Philadelphia Water Department has compiled the following table showing the number of gallons pumped each year and the total cost of pumping from 1870 to 1883, for the supply of that city. The cost of delivering one million gallons into the reservoirs is shown by this statement to have ranged from \$7.59 in 1879 to \$10.37 in 1881, the average for the fourteen years being \$9.56:

Year.	Gallons pumped.	Total cost.
1870.....	13,392,808,272	\$19,586 69
1871.....	13,498,399,481	100,194 36
1872.....	13,100,018,461	108,652 57
1873.....	14,223,198,443	123,754 79
1874.....	14,533,425,097	135,182 96
1875.....	15,097,166,069	155,216 14
1876.....	17,473,308,039	173,399 99
1877.....	17,817,144,792	154,019 10
1878.....	19,101,664,332	172,996 57
1879.....	19,894,101,515	151,033 60
1880.....	21,120,792,386	174,616 46
1881.....	22,721,014,838	235,611 64
1882.....	24,691,440,430	252,359 66
1883.....	25,284,957,251	246,913 76
Total		\$2,312,538 29

THE Atlanta, Geo., *Constitution* says that malarial fevers are more frequent and more tenacious there than was formerly the case, and attributes this to the fact that the sewers from the populous part of the city empty into open streams on flat ground around the city, about a mile from its centre. "In almost every part of the city, about one mile from the car-sheds, one can see the yawning mouths of these sewers, vomiting their overloads of filth into shallow flats." This would seem to be a good opportunity to try some mode of sewage disposal.

A FACTORY has lately been established in Hamburg for the extraction of oil from cotton-seed. This is the first establishment of the kind erected in Germany. The oil industry has reached a very considerable development in Hamburg; more than 40,000 metric tons of seeds and other oleaginous substances (such as peanuts) are annually used in the oil manufacture.—*Revue Industrielle*.

LEAD IN SPAIN.—In the lead-production of different countries, Spain still holds the first place, the amount reaching some 120,000 tons in one year, or one-sixth more than America, which comes next on the list, while Germany follows with 90,000. Of Spain's total production, some 67,000 tons are derived from one district, that of Linares, in which more than eight hundred mines are registered. Of this large number, however, only a comparatively small proportion are actually worked on a large scale, and there are only about fifty in which steam-power is used. The total number of steam-engines employed is stated to be one hundred and thirty, near one-half of the number belonging to English companies; in fact most of the mining machinery and pumping-engines in all the mines are of English make.—*Mech. World and Steam-User's Journal*.

CEMENT-LINED WATER-PIPES IN THE BOSTON WATER-WORKS.

WE have received the following information from Mr. Dexter Brackett, Assistant City Engineer of Boston, in reference to a recent newspaper paragraph on the breakage of cement-lined water-pipes connected with the Mystic supply:

"The pipe-distribution system of the Mystic works was originally laid in 1864-68, with wrought-iron and cement pipe. In Charlestown, where the pipe system is controlled by the city of Boston, the greater portion of the cement-lined pipes have been replaced by cast-iron. The cities of Somerville and Chelsea own and control their pipe systems. Their cement-lined pipes are in a very bad condition, and recently there were thirty-nine breaks or bursts in the Somerville mains in about two weeks. These bursts occasion a large waste of water, and as this water is supplied by the Boston works, the Boston Water Board is desirous of having some steps taken to remedy the trouble. As is the case in many small cities, the cost of relaying the pipes is a serious obstacle to the prompt remedying of the trouble."

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING NOVEMBER 1, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoeal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.				
NORTH ATLANTIC CITIES.																								
Portland	Maine.	35,000	17	25.8	2	11.7			4		1					1								
Boston	Mass.	435,000	188	22.5	54	28.7	2		41	5	5	5	2	6	1	4	19		8		1			5
Lowell	Mass.	71,500	31	22.5	10	32.2		1	3	1	3	2		1			2							
Worcester	Mass.	69,000	21	15.8	11	52.3			2			3					2		2		1			
Fall River	Mass.	67,000	31	24.1	18	58.0		3		3	6		1				2		2		3			
New Haven	Conn.	69,500	18	13.4	6	33.3	2				1			2			4		2					
Providence	R. I.	125,000	52	21.6	15	28.8	3		8		2	3		2	1		3		2					
Total		872,000	358	21.3	116	32.4	7	4	56	11	18	13	3	11	2	5	32		14		3	2		5
EASTERN CITIES.																								
Albany	New York	103,000	50	25.2	16	32.0			10	6		3		3			3		1					1
New York	New York	1,355,000	622	23.9	215	34.5	26	1	112	17	49	33		15	9	1	53		30		9	4		5
Brooklyn	New York	225,000	84	19.4	28	33.3	1	2	4	5	1	3		1		6	4		7		2			1
Hudson County	New Jersey	225,000	84	19.4	28	33.3	1	2	4	5	1	3		1		6	4		7		2			1
Newark	New Jersey	225,000	84	19.4	28	33.3	1	2	4	5	1	3		1		6	4		7		2			1
Philadelphia	Pa.	940,000	320	17.7	112	35.0	16	1	35	28	14	13		9		4	25	3	12		1	1		
Wilmington	Delaware	50,000	20	20.8	10	50.0		2	1	1	1	3			2									
Total		2,673,000	1,096	21.8	381	34.7	43	6	162	57	65	55		28	11	11	85	3	50		10	7		7
LAKE CITIES.																								
Buffalo	New York	105,000	35	17.3	11	31.4		1		1	6	4		2					1	1				
Rochester	New York	105,000	35	17.3	11	31.4		1		1	6	4		2					1	1				
Cleveland	Ohio	210,000	62	15.3	33	53.2	1		8	1	6	2		1		3	1		2		17	1		
Detroit	Michigan	140,000	66	24.5	33	50.0			6	3	6	7		1	1	3	1		2					
Chicago	Illinois	280,000	100	18.0	33	50.0			6	3	6	7		1	1	3	1		2					
Milwaukee	Wisconsin	280,000	100	18.0	33	50.0			6	3	6	7		1	1	3	1		2					
Total		455,000	163	18.6	77	47.2	1	1	16	5	18	13	1	4	3	1	7		3	1	17	1		
RIVER CITIES.																								
Pittsburg	Pa.	210,000	73	18.1	37	50.6	5		1		4	16		5		2	7		3		1	3		
Cincinnati	Ohio	275,600	106	20.0	37	34.9	5		16	3	6			6		2	5	1	4		6			
Louisville	Ky.	100,000	34	18.8	17	50.0	1	1		3		4		5	1	1		1	1		1			
Indianapolis	Ind.	94,000	27	14.0	16	50.2	1	2			1	4		7			2		1					
Minneapolis	Minn.	100,000	27	14.0	16	50.2	1	2			1	4		7			2		1					
Kansas City	Mo.	75,000	23	15.9	8	34.7	1		8	1	1			5	6	4	7	2	3					
St. Louis	Mo.	375,000	166	28.0	61	36.7	5	1	17	3	16	14		5	6	4	7	2	3					
Total		1,120,600	429	19.7	176	41.0	18	4	42	10	28	38	1	28	7	9	21	4	12		8	3		
SOUTHERN CITIES.																								
District of Columbia	Wh.	133,800	39	15.1	9	23.0			8	1	1	2		3		2	1	1	1					2
"	Col.	60,900	45	33.8	20	44.4	3	1	8	2	1	1		1		1	1	1	1	1				
Richmond	Va.																							
"	Wh.																							
"	Col.																							
Charleston	S. C.	25,000	5	10.4	2	40.0					1													
"	Wh.	27,800	21	39.3	8	38.0																		
Atlanta	Geo.								3		1			1	1			2	3					
"	Wh.																							
Augusta	Geo.																							
"	Col.																							
Savannah	Geo.																							
"	Wh.																							
"	Col.																							
Nashville	Tenn.																							
"	Wh.																							
"	Col.																							
New Orleans	La.	171,000	82	24.9	20	24.3	1		9	1	3	2		14			6		4					
"	Wh.	68,000	46	38.0	20	43.4	1		8		3			7										
"	Col.																							
Total White		320,800	126	19.9	31	24.6	1		17	2	6	4		3	14	2	7	1	8	4	1			2
Total Colored		160,100	112	36.4	48	42.8	4	1	19	2	5	1		2	8	1	3	4	1					1
Total in 24 U. S. Cities		5,619,500	2,284	21.1	829	36.2	74	16	312	87	140	124	5	76	45	29	153	11	87	2	38	13		15
October 18.																								
Total in 28 English Cities		8,762,354	3,545	21.1			112					33		68		74					39		14	56
"	8 Scottish Cities	1,254,607	514	21.3			16					23		13		18				18			18	
"	16 Irish Cities	858,660	407	24.6			4		56			1		9		13			96				2	
"	139 German Cities																	78						
"	15 Swiss Cities																							
"	15 Swiss Cities																							

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

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The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending November 1, 1884, in 24 cities of the United States, having an aggregate population of 5,619,500, there were 2,284 deaths, which is equivalent to an annual death-rate of 21.1 per 1,000. The death-rate in the North Atlantic cities was 21.3, in the Eastern cities 21.3, in the Lake cities 18.6, in the River cities 19.7, and in the Southern cities, for the whites 19.9, and for the colored, 36.4 per 1,000.

Accidents caused 3.2, consumption 13.9, croup 3.8, diarrhoeal diseases 6.2, diphtheria 5.5, typhoid fever 3.3, malarial fevers 2.0, scarlet fever 1.1, pneumonia 6.8, bronchitis 3.8, measles 1.2, puerperal diseases 0.5, and whooping-cough 0.6. The highest mortality from diphtheria was in the River cities—viz., 8.8 per cent. of the deaths. In the Lake cities it caused 7.9. Typhoid fever caused 6.2 per cent. of the deaths in the River cities, and malarial fevers 11.1 among the whites and 7.1 among the colored in the Southern cities. Measles caused 10.4 per cent. of the deaths in the Lake cities, all the deaths occurring in Cleveland.

BOSTON, MASS.—C. E. Davis, Jr., reports 36 new cases of diphtheria, 55 of scarlet fever, and 57 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 32 new cases of diphtheria and 3 of scarlet fever.

BALTIMORE, MD.—The report of the Board of Health for the week ending November 1 records 148 deaths, which includes 64 under 5 years of age. The annual death-rate for the whole population was 18.8 per 1,000, or 17.1 for the whites and 28.6 for the colored. Diphtheria caused 15 deaths, croup 4, scarlet fever 3, whooping-cough 1, typhoid fever 4, malarial fevers 3, diarrhoeal diseases 6, consumption 18, acute lung diseases 6, and violence 6.

MASSACHUSETTS.—During the week ending October 25 there were reported 453 deaths in 105 cities and towns of the State, having an aggregate population of 1,332,401, which is equivalent to an annual death-rate of 17.7 per 1,000, against 17.6 for the previous week. Diphtheria caused 40 deaths, diarrhoeal diseases 30, typhoid fever 23, scarlet fever 9, whooping-cough 5, and measles 1. To consumption were attributed 63 deaths and to lung diseases 40. The highest rates recorded were 31.0 in New Bedford, 24.8 in Boston, and 24.8 in Haverhill.

ENGLAND.—During the week ending October 18 the annual death-rate in the 28 great cities of England and Wales was 21.1 per 1,000. The highest annual death-rate from scarlet fever was 2.2 in Cardiff; from measles 2.9 in Bolton, and from "fever" 5.4 in Derby. The 33 deaths from diphtheria include 21 in London, 4 in Liverpool, and 2 in Manchester. Small-pox caused 10 deaths in London, besides 18 in the Metropolitan Asylum Hospital, 2 in Sunderland, 1 in Liverpool, and 1 in Birkenhead. The highest rate recorded, 30.2, was in Bolton; the lowest, 13.6, in Halifax.

LONDON.—Births, 2,812; deaths, 1,517, the latter being equivalent to an annual death-rate of 19.2 per 1,000.

The fatal cases of small-pox, which numbered 11 the previous week, rose to 28, including 18 deaths in the Metropolitan Asylum Hospitals. The number of small-pox patients in the hospitals, which was 522 the preceding week, rose to 573, there having been 149 new cases admitted, against 69 for the previous week. There were also in the hospitals at the close of the week 112 cases of typhoid fever and 7 of typhus fever. Measles caused 12 deaths, scarlet fever 27, diphtheria 21, whooping-cough 15, typhoid fever 17, diarrhoea 44, consumption 175, diseases of the respiratory organs 286, and different forms of violence 50.

SCOTLAND.—The death-rate in the 8 principal towns during the week ending October 18 was 21.3 per 1,000. This rate is 1.9 below that for the corresponding week of last year, and 1.5 below that for the previous week this year. The highest rate, 25.2, was in Aberdeen; the lowest, 12.5, in Leith. The mortality from the zymotic diseases was at the rate of 4.2 per 1,000, rising to 7.1 in Paisley.

GLASGOW.—Deaths, 229; annual death-rate 23.0 per 1,000. Measles caused 7 deaths, scarlet fever 14, diphtheria 3, whooping-cough 8, fever 8, diarrhoea 10, acute lung diseases 51, and violence 7.

EDINBURGH.—Deaths, 86; annual death-rate 18.1 per 1,000. Scarlet fever caused 1 death, diphtheria 3, whooping-cough 6, fever 3, diarrhoea 4, acute lung diseases 12, and violence 3.

IRELAND.—The average annual death-rate in the 16 principal town districts for the week ending October 11 was 22.4 per 1,000. The deaths from the principal zymotic diseases were equal to an annual rate of 3.5 per 1,000, the rates varying from 0.0 to 9.3 in Waterford. Scarlet fever was the most fatal of the zymotic diseases.

DUBLIN.—Deaths, 192; annual death-rate, 28.4. Scarlet fever caused 11 deaths, whooping-cough 2, typhoid

fever 1, diarrhoea 15, consumption 22, acute lung diseases 32, and violence 5.

BELFAST.—Deaths, 85; annual death-rate, 20.4 per 1,000. Scarlet fever caused 2 deaths, whooping-cough 2, diphtheria 2, typhoid fever 2, diarrhoea 6, consumption 12, acute lung diseases 16, and violence 1.

IRELAND.—The average annual death-rate in the 16 principal town districts for the week ending October 18 was 24.6 per 1,000.

DUBLIN.—Deaths, 202; annual death-rate, 29.9 per 1,000. Scarlet fever caused 5 deaths, typhus fever 2, typhoid fever 7, diarrhoea 10

fever caused 15 deaths, which is an unusually low estimate for the season. Small-pox caused 1 death, measles 19, diphtheria 31, whooping-cough 2, diarrhoeal diseases 81, consumption 218, acute lung diseases 71, and violence 34. On October 12 there were in the hospitals under treatment 4 cases of small-pox, 464 of typhoid fever, and 49 of diphtheria.

Havre.—October 5-11. Deaths 77; annual death-rate 37.9 per 1,000. Diphtheria and croup caused 4 deaths, acute lung diseases 6, consumption 20, diarrhoea 6, and violence 5.

Rheims.—October 5-11. Deaths, 51; annual death-rate, 28.2 per 1,000. Diphtheria and croup caused 3 deaths, typhoid fever 3, diarrhoeal diseases 10, consumption 9, acute lung diseases 6, and violence 2.

Belgium—Brussels.—October 5-11. Deaths, 177; annual death-rate, 21.8 per 1,000. Small-pox caused 1 death, measles 1, scarlet fever 3, typhoid fever 3, croup 6, whooping-cough 3, diarrhoeal diseases 27, acute lung diseases 19, consumption 26, and violence 4.

The return for the quarter ending October 1 registers 3,352 births and 2,686 deaths, being respectively equal to a birth-rate of 31.4 per 1,000, and a death-rate of 25.2 per 1,000. Of the decedents 1,411 were under 5 years of age. Of the infectious zymotics small-pox was the most fatal, causing 48 deaths. Measles caused 4 deaths, scarlet fever 19, typhoid fever 22, croup 41, diphtheria 14, whooping-cough 22, diarrhoeal diseases 686, consumption 295, acute lung diseases 231, and violence 55.

Italy—Turin.—Week ending October 4. Deaths, 120; annual death-rate, 17.1 per 1,000. Small-pox caused 3 deaths, measles 1, typhoid fever 7, consumption 6, and violence 5.

Russia—St. Petersburg.—Week ending October 4. Deaths, 366; annual death-rate, 19.1 per 1,000. Small-pox caused 4 deaths, measles 2, scarlet fever 13, typhoid fever 7, diphtheria 3, whooping-cough 3, diarrhoeal diseases 55, and acute lung diseases 50.

Denmark—Copenhagen.—October 1-7. Deaths, 124; annual death-rate, 24.2 per 1,000. Measles caused 3 deaths, croup 4, whooping-cough 5, typhoid fever 1, diarrhoeal diseases 16, consumption 10, acute lung diseases 10, and violence 3. During the week there were reported 173 new cases of measles, 17 of scarlet fever, 10 of diphtheria, and 15 of typhoid fever.

Denmark—Copenhagen.—October 8-14. Deaths, 121; annual death-rate, 23.6 per 1,000. Measles caused 5 deaths, croup 1, whooping-cough 3, typhoid fever 1, diarrhoea 9, consumption 16, acute lung diseases 6, and violence 5.

Association News.

CHICAGO MASTER PLUMBERS.—The association met November 5, the Dearborn Street headquarters being well filled, President Edward Baggott in the chair, and William Oliphant, secretary. The strike of some 20 per cent. of the journeymen plumbers, an event that had happened a few days before, owing to differing views as to the hours that should make a winter day's work, was considered, and a committee of the journeymen made its appearance in the anteroom to treat with the association's Committee on Arbitration, Messrs. M. C. Corboy, P. Nacey, William Sims, Robert Griffith, J. C. Clark, Val. Ruh, and E. Baggott. A settlement satisfactory all around was reached, on the basis of some mutual concession, and it was fixed that the hours of labor should be nine hours from November 15 to February 15. Said Spokesman Corboy, in closing his report of the happy settlement: "The journeymen also request that if any difficulty should arise in the future, the Arbitration Committee of the Master Plumbers' Association would meet the Arbitration Committee of the Journeymen and Gas-Fitters." A question was asked if the latter association was not a secret one, and the names of its officers withheld from publicity. In answer, Mr. Corboy said that, on occasion arising, the names of all officers would be communicated to the masters' association or any committee or member thereof. The Committee on Apprentices, through Chairman J. J. Hamblin, submitted an interesting report of the progress made in completing the desired registers. He had 120 names of apprentices, yet a great many masters had yet to come to time. The meeting adjourned to participate in the bedlam celebrations of the election.

BALTIMORE MASTER PLUMBERS.—(From a special correspondent.) There was no meeting of the Master Plumbers' Association on October 16, for want of a quorum. Why so little interest is taken in the affairs of the association we cannot tell, but such is the fact we know quite well. This does not speak well for the association, in whose city was held the second convention. We hope at the next meeting the President will administer a large dose

of very "hot soft solder" to the absentees, by way of persuading them to give more time and attention to the affairs of the association.

BALTIMORE MASTER PLUMBERS.—A correspondent writes us under date of the 8th inst.: "It is with feelings of the deepest sorrow and regret that I announce to you the death of the Recording Secretary of the Master Plumbers' Association of Baltimore, Mr. William D. L. Peacock, who died suddenly on the morning of November 7, 1884, in the thirty-first year of his age. The executive officers and other members of the association will hold a meeting this evening, and will make arrangements to attend his funeral, Sunday, the 9th inst. Mr. Peacock was a young man, who gave fair promise to become an honor to the association."

BOSTON, MASS., MASTER PLUMBERS.—The association met November 6, Mr. Riley presiding. After the regular business of the meeting was transacted, the Chairman of the Apprentices Committee read his report, which was most favorably received. With this meeting ends the discussion of "Trade Protection," leaving the dealers and plumbers in Boston working in harmony. A series of discussions on sanitary matters is to be commenced at once, which it is believed will be exceedingly interesting and profitable to the members during the winter season.

PHILADELPHIA ENGINEERS' CLUB.—The club met October 18, President William Ludlow in the chair, twenty-five members and three visitors present. Mr. C. Henry Roney showed a portable storage-battery for mining and exploring purposes, with small incandescent-lamps, illustrating his remarks with blackboard sketches. The battery shown was a modification of Planté's, devised by Dr. E. T. Starr, of Philadelphia, the electrodes consisting of V-shaped plates of sheet-lead arranged over each other, the convexity downward, with a slight interval between them, their ends attached to a lead frame by "burned" joints, the interstices between the plates filled with finely divided metallic lead, exposing a large surface to oxidation and reduction when subjected to dynamic, electric, or voltaic energy, and, in turn, giving off a large percentage of the "stored" energy to incandescent-lamps placed in the circuit. The battery shown measured 3¼ inches long, 2¼ inches high, and ¾ of an inch thick, and would maintain a small two-candle incandescent-lamp at incandescence for about one hour. A battery sufficiently large to run an eight-candle lamp for ten or twelve hours would not be too large or heavy to carry conveniently for mine or other underground exploration. Mr. William L. Simpson exhibited and described the Thompson indicator. Cards can be taken with it at as high a pressure as 500 pounds per square inch. The coiled spring within the paper cylinder, for increasing or decreasing the tension for different speeds of engines, is so arranged that as little or much of it can be taken up as may be desired. By means of a jamb-nut the horn-handle screw can be set so as to regulate the pressure of the pencil on the paper, the back of the screw touching against a small post, and thus avoiding any strain tending to throw the parts out of line through too much pressure. All springs are scaled, providing for 30 inches vacuum; and the capacity of any spring can be ascertained by a simple rule. To adapt the Thompson indicator to all pressures, springs can be made to any desired scale. The following are the most generally used: 8, 10, 12, 16, 20, 24, 30, 32, 40, 48, 50, 56, 60, 64, 80, 100. For pressures from 65 to 85 pounds a 40-lb. spring is best adapted, for as 40 pounds pressure on a 40-lb. spring will raise pencil one inch, 85 pounds pressure on the same spring will raise pencil about two inches, which is the usual height of a diagram. Mr. J. J. de Kinder described the repairs to the 36-inch Belmont submerged main, Philadelphia, recently made by him. The specially novel feature of this undertaking was a floating cofferdam, the bottom of which was built around the main and the whole structure kept in exact balance, during freshets, etc., by two water-tight scows, suspended on its sides, into or out of which water was pumped to regulate the weight. W. Bugbee Smith introduced the subject of the Fire Protection of Mills. Mills must be properly built and furnished with adequate fire-extinguishing apparatus. The best construction has been found to consist of heavy wooden posts and girders, solid plank floors and roof. The usual fire-extinguishing apparatus consists of water-buckets, hydrants, and hose. In addition to this, some mills are furnished with perforated sprinkler-pipes, running lengthwise through the mill, perforated with holes one-tenth of an inch diameter and about nine inches apart. In case of a fire, by opening a valve outside of the building, water is let into the pipes and on

the fire. The objection to this system is the fact that the water is not confined to the spot where the fire occurs, but is distributed over such a large area that much damage is done by it. To overcome these objections automatic sprinklers have been invented. These are valves placed on a system of pipes near the ceiling and opened by the heat of the fire. They are kept closed by means of a fusible solder which melts at about 166° Fah. The heat rising from a fire melts the solder joints of the sprinkler immediately over it, and thus the water is put just where it is needed. There are two general classes of automatic sprinklers, the sealed, such as the Parmelee, Burritt, Rose and, Bishop; and the sensitive, such as the Grinnell, Burritt, Brown & Hall, and the Kane. After describing the methods of piping a mill for each of the classes, samples of the above-mentioned sprinklers were exhibited and their peculiarities explained. The automatic sprinklers have been in use about twelve years, and recent tests show that the fusible solder has not lost its strength and sensitiveness in that length of time, though exposed to pressure and water-hammer. The secretary exhibited, for Mr. S. L. Smedley, a photo-lithographic reproduction of a topographical map of Philadelphia, by John Hills, 1796, and pointed out some of the remarkable evidences of its great accuracy in detail. Mr. Francis Lightfoot, of West Chester, introduced by the secretary, explained a model of a rail-joint in which no plates or loose pieces are required, the ends of the rail being lapped and bolted together through oblong slots. Howard Murphy, Secretary and Treasurer.

THE CHICAGO ARCHITECTS are preparing for the convention of Western and Southern architects, that is to begin in this city November 12. A committee is at work arranging a programme for the convention, and other representative men will serve as a reception committee. The place of meeting is not determined upon, and the headquarters have still to be located at some hotel. The prospect is reported good that there will be an outside attendance of 100 or more gentlemen.—*Inter-ocean.*

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
November 8...	24.34	18.65	22.52	29.02	28.21	18.80

E. G. LOVE, Ph.D., Gas Examiner.

ONE of the most violent explosions of illuminating-gas which has been reported for some time occurred in a house in Edward Street, Bermondsey, London, October 17. So violent was it that the house, a tenement, was almost completely demolished. One child was killed, and a number of persons injured. The facts, as reported in the *London Times*, are as follows: A smell of gas pervaded parts of the tenement-house during the day, becoming so strong in the evening that the mother of the children of one family had the children moved to a different room from what they ordinarily slept in for fear they might be suffocated in the night. She also sent word early in the evening to the office of the South Metropolitan Gas Company, whose mains supplied the house with gas. The company sent two men to ascertain the cause. After taking up the street-pavement, and failing to find the leak on the street, one of the men lit a torch of tow, and entered a room in the house where the smell of gas was strongest, against the protest of the woman. Immediately the explosion followed, blowing out the front and rear walls of the house, and almost destroying it totally. The inmates and several persons who happened to be in the street were buried in the ruins. Investigation which followed seemed to show that the accident was due to the breaking of a street-main due to the disturbance of the street by the work of the Metropolitan main drainage. Gas from this broken street-main found its way into the tenement through disused drain-pipes, and thus the explosion was caused.

THE official examination into the recent explosion of gas in the conduit of the electric wires in Philadelphia resulted in a report to the Mayor, November 5, that, spite of the pierced covers placed over the manholes, the accumulation of gas had been so rapid that an explosion more disastrous than any that has yet occurred was imminent at any moment.

The Mayor immediately sent a notification to President Johnstone, of the Underground Electric-Light and Power Company, stating that some thorough system of ventilating the conduit must be adopted, or it would become the duty of the department to prohibit the company from sending the current over the wires for their lamps and customers at night.

THE United States State Department has been making efforts to obtain through its consular agents in leading cities of Europe some authentic information in regard to the application of electricity for the purpose of lighting streets and buildings.

THE electric-lamp (Woodhouse & Rawson) was applied to the lighting of a car on a railroad in Massachusetts last week.

THE consolidation of the New York gas companies, excepting the Equitable, was perfected last Monday. The agreement of consolidation provides that the capital stock shall be \$45,000,000, in case all the seven companies merge in the consolidation; it is apportioned to the several companies as follows: New York, \$7,821,000; Manhattan, \$12,352,000; Metropolitan, \$7,422,000; New York Mutual, \$5,922,000; Municipal, \$5,276,000; Knickerbocker, \$3,104,000; Harlem, \$3,103,000. The agreement has been signed for all the companies excepting the Mutual, whose charter is thought to prevent its entering the consolidation until the charter is changed. The price of gas will be to consumers of less than 100,000 cubic feet per month, \$1.75 per 1,000 cubic feet; to consumers of more than 100,000 cubic feet per month, \$1.50 per 1,000 cubic feet. The officers are: President, General Charles Roope; First Vice-President, Thomas K. Lees; Second Vice-President, Oscar Zollikofer; Treasurer, James W. Smith; Secretary, H. E. Gawtry.

Notes.

CONSTRUCTION.

BEAUMONT, TEX., is discussing water-works.

FRANKFORT, KY., has contracted for water-works.

DALTON, GA., is discussing the building of water-works.

MARSHALL, TEX., is still discussing the water-works project.

A NEW water-works company is being organized in Austin, Texas.

BUFFALO, N. Y.—The contract for lighting and heating the new Arsenal building in Buffalo was awarded, November 6, to Hardwicke & Ware, they being the lowest bidders. The bids were as follows: Barnard & Geiger, lighting, \$1,750; Irlbacker & Davis, lighting, \$1,553; heating, \$3,800. The E. H. Cook Company (limited), lighting, \$1,575; heating, \$3,667. Hardwicke & Ware, lighting, \$1,300; heating, \$3,239.

PHILADELPHIA, PA.—Proposals were received for the construction of a 16"x23" sewer, on Susquehanna Avenue from Germantown Avenue to Seventh Street, a total length of 380 feet, and the following bidders presented bids: W. H. Yoast, who bid \$2.15 per foot and \$25 per manhole; W. C. Eyre, at \$2.17 per foot and \$27 per manhole; and M. C. Hong, at \$1.92 per foot and \$22 per manhole. The last bidder received the contract.

W. H. H. Achuff was awarded the contract for constructing a wooden trestle-bridge over the Reading Railroad, at Fifteenth and Somerset Streets, for \$4,990.

Chief Engineer Ludlow, of the Water Department, asked the Finance Committee to appropriate \$10,000 for the proposed system of aerating the Schuylkill water.

WATER-WORKS PUMPS.—Proposals for a compound condensing pumping-engine, capacity 5,000,000 gallons in 24 hours, will be received until November 17. Address John McConnell, supervisor of Lake View, Ill.

ST. PAUL, MINN.—The Council Committee on Streets has received from A. A. Stickney, of the Minnesota and Northwestern Railway, plans for the proposed railway bridge between the end of Starkey Street and the Jackson Street Levee. The bridge to be constructed by the company will be of iron, 1,400 feet long, and contain four spans of 225 feet each, and a draw-span 412 feet long. It will be intended for only one track.

ATLANTA, GEO., has expended \$300,000 on the street sewers this year.

LIMA, O.—A proposition was submitted to the voters of this city, November 4, as to whether the city shall issue bonds to the amount of \$200,000 for the purpose of constructing water-works. The proposition was carried by a good majority.

CLEVELAND, O.—It is probable that the city will apply to the State Legislature for authority to issue bonds to pay the cost of removing the bar in the river. The City Engineer has been directed to estimate the cost.

NEWARK, N. J., SEWERAGE.—As advertised under the head "proposals" in this issue, bids will be received until November 20 at the office of the Street Commissioner, for work and materials for constructing a sewer from Peddie Street to Newark Bay. The plan contemplates the intercepting of the sewage near the present point of discharge of the city sewers, and removal to a pumping-station, to be lifted into a flume and discharged into Newark Bay. The total length is about 25,940 lineal feet. There are five sections, as follows: Sections 1 and 2 will consist of an egg-shaped sewer equivalent to a 3-foot circular, intercepted to a 6' circular sewer. The foundations will be timber and concrete, or rubble masonry, according to the nature of the ground. The lining will be brick. Section 3 will be a double sewer enlarged for a sewer of deposit, about 300 feet long, with grooves in the masonry forming chambers for damming the water at either end, also foundations and masonry of pump-wells, engine-house and boiler-room. The work is similar in character to that of Sections 1 and 2. Section 4 will be a wooden flume 5' x 5', laid four feet below the level of the meadow, and about 9,500 feet in length. No iron will be used, and the timber will be fastened with wooden pins treenailed in such a way as to be firmly held in place. Section 5 will be a continuation of Section 3, about 2,500 feet into the bay. The foundation, however, will be piles a portion of the way, and piles will be used to protect the flume and hold it in place. In other respects the construction will be similar to Section 4. The Street Commissioner is William Allen; the Chairman of the Sewers and Drainage Committee of Common Council is Henry S. Dunn.

ASHLAND, WIS.—The Ashland Water-Works Company filed articles of association with the Secretary of State November 6. The capital stock is \$100,000. The company will establish a system of water-works for the city.

ST. PAUL, MINN.—At the meeting of the Water Board, November 6, Engineer Waters submitted a report showing the amount of pipe ordered for mains to be laid the next year. The amounts were as follows: 6-inch pipe, 29,000 feet; 8-inch, 21,000 feet; 10-inch, 1,200 feet; 12-inch, 6,200 feet; 16-inch, 1,350 feet; 24-inch, 15,650 feet, making a total of 62,400 feet of pipe.

PHILADELPHIA, PA.—Chief Engineer Ludlow will ask Councils to appropriate the funds necessary to provide pumps and other apparatus required to aerate the Schuylkill water. The plan will be similar to that used at Hoboken.

FORT WAYNE, IND.—A. Hattersley & Sons, plumbers, etc., have received the contract for the plumbing, gas, and steam-heating in the new Masonic Temple.

DETROIT, MICH.—William McFadden, plumber, has just received the contract for laying over 3,000 feet of 2-inch cast-iron water-pipe for Harvey King, at the new stock-yards; 100 hydrants will be required. The work will begin within a fortnight, the pipe to be laid four feet. Estimated cost, \$3,000.

DETROIT, MICH.—John D. Monat & Co. have received the contract at \$1,800 for the steam-heating of the Palmer Memorial Church.

E. F. Webster & Co. have received the contracts for plumbing and steam-fitting in the Convent of the Sacred Heart, Grosse Point, at \$10,000.

GOVERNMENT WORK.

CHOPTANK RIVER, MD.—The following bids for dredging Choptank River, Md., were received by W. F. Smith, U. S. Agent, October 23, at the U. S. Engineer Office, Wilmington, Del.: F. C. Somers, Philadelphia, Pa., 23 1/4 c. in scows; Baltimore Dredging Co., D. Constantine, Pres., Baltimore, Md., 30c. in place, 25c. in scows; Thomas P. Morgan, Washington, D. C., 27 1/2 c.; Morris & Cumings Dredging Co., New York City, 19 1/4 c. deposited on banks, 21c. for material carried away. Work awarded to Morris & Cumings Dredging Co.

CORSICA CREEK, MD.—The following bids for dredging Corsica Creek, Md., were received by W. F. Smith, October 30, at the U.

S. Engineer Office, Wilmington, Del.: American Dredging Co., Philadelphia, Pa., 20c. in scows, 26c. in place; Morris & Cumings Dredging Co., New York City, 25c.; Thomas P. Morgan, Washington, D. C., 14c.; P. S. Ross, Jersey City, N. J., 16c. in scows; F. C. Somers, Philadelphia, Pa., 18c. in place, 13 1/2 c. in scows; Baltimore Dredging Co., D. Constantine, Pres., 15 1/4 c. in place, 13c. in scows. Work awarded to Baltimore Dredging Co.

TAUNTON RIVER, MASS.—Bids for rock-excavation and dredging: J. H. Fenner, Jersey City, N. J., ledge, 366 cubic yards, \$21.75 per cubic yard; boulders, 180 cubic yards, \$5; dredging class H, 1,600 cubic yards, 95c. and \$1.15; dredging class S, 13,500 cubic yards, 35c. and 30c.; gross amount of bid, \$14,724.05; dredging material, classes H and S, above Berkley Bridge, \$1.15 per cubic yard. Richard M. Payn, Albany, N. Y., ledge, \$29; boulders, \$7; dredging class H, \$1.48; class S, 30c.; gross amount of bid, \$18,292; \$2 extra for class H above Berkley Bridge, and \$4 extra for class S. P. Sanford Ross, Jersey City, N. J., ledge, \$25; boulders, \$12; dredging class H, \$1.25; class S, 55c.; gross amount of bid, \$20,735; 10c. extra for dredging classes A and S above Berkley Bridge. Solon S. Andrews, Biddeford, Me., and Thomas Symonds, Leominster, Mass., ledge, \$26; boulders, \$8; dredging class H, \$3.50; class S, 42c.; gross amount of bid, \$22,226; \$2 extra for dredging above Berkley Bridge. Contract awarded to Mr. Fenner.

GEORGETOWN HARBOR, D. C.—The contract for rock-excavation has been awarded to Edwin R. Lowe, of New York, at \$7,387. The bids were published in our issue of November 6.

HAMILTON & SOULE, of Chebeague, Me., have received the contract for the improvement of the Saco, Me., breakwater.

CEDAR RIVER HARBOR, MICH.—Bids for pier extension opened by Lieut.-Colonel J. W. Barlow: Canfield & Chapman, Watkins, N. Y., \$12,012.50; Olaf A. Norman, Escanaba, Mich., \$13,350; Schwarz & Berner, Green Bay, Wis., \$10,130.50; Truman & Cooper, Maintowac, Wis., \$10,491; Hanson & Scove, Maintowac, Wis., \$10,860.25. The contract was awarded to Schwarz & Berner.

MOOSE-A-BEC BAR, ME.—Proposals for 20,000 cubic yards of dredging, opened by Colonel E. Blount: Moore & Wright, of Portland, Me., were the only bidders, at 48c. per cubic yard. Bid not accepted.

CAPE FEAR RIVER, N. C.—Bids for building scows: George Summerell, Wilmington, N. C., \$980 each; G. H. Ferris, Baltimore, Md., \$945.50 each. These bids have been rejected, and Lieut.-Col. Craighill has been given authority to build the scows himself.

LUBEC CHANNEL, ME.—Proposals for 32,000 cubic yards of dredging: Moore & Wright, of Portland, Me., were the only bidders, at 42c., and their bid was accepted.

POST-OFFICE, ETC., TERRE HAUTE, IND.—Synopsis of bids for stone and brick work of basement and superstructure, opened October 31: S. C. Kane, brick-work—basement to top of water-table, \$4,785; superstructure, \$12,950; time to complete, November, 1885; total, \$17,735. John Moore, \$3,300; \$12,700; 100 days; \$16,000. J. W. Miller, \$3,448; \$11,604; June 30, 1886; \$15,052. S. C. Beach, \$2,863.66; \$11,502.21; April 1, 1886; \$14,365.87. Indiana White Lime-Stone Co., stone-work—basement to top of water-table, \$6,812; superstructure, \$32,255.40; time to complete, November 30, 1885; total, \$39,467.40. Hallowell Granite Co., \$9,554.50; \$44,800; December 31, 1885; \$54,354.50. Andrew Dall, Jr., \$5,699; \$33,398; November 1, 1885; \$39,097. E. Brainerd & Co., \$5,190; \$32,210; November 11, 1885; \$37,400. Ohio Blue S. stone, \$5,434; \$34,552; November 11, 1885; \$39,986. Bedford Ind. Stone: Terre Haute S. W. Co., \$7,500; \$38,500; June 30, 1886.

MISSISSIPPI RIVER LEVEES.—John A. Cannon, Greenville, Miss., Riverton to Hughes, earth-work, 21 cents per cubic yard; tuft sodding, 2 1/4 cents per square yard; solid sodding, 8 cents per square yard; from Clay and Baggott to Easton, earth-work, 25 cents; tuft sodding, 2 cents; solid sodding, 12 cents; one bid informal; he requested to withdraw bid, as he had made an error in filling it. John J. Cooney, Memphis, Tenn., Riverton to Hughes, earth-work, 26 cents; tuft sodding, 1 1/2 cents; solid sodding, 6 cents; Clay and Baggott to Easton, earth-work, 23 1/4 cents, tuft sodding 1 cent, solid sodding 9 cents. Joseph C. Neely, Bard-

well, Ky., Riverton to Hughes, earth-work 33 cents, tuft sodding 1 1/4 cents, solid sodding 3 1/2 cents; Clay and Baggott to Easton, earth-work 33 cents, tuft sodding 1 1/4 cents, solid sodding 3 1/2 cents. Dabney & Gray, Greenville, Miss., Riverton to Hughes, earth-work 29 1/2 cents, tuft sodding 1 cent, solid sodding 10 cents; Clay and Baggott to Easton, earth-work 28 1/2 cents, tuft sodding 1 cent, solid sodding 10 cents. Robert Johnson, Memphis, Tenn., Riverton to Hughes, earth-work 29 cents, tuft sodding 1 1/2 cents, solid sodding 3 cents; Clay and Baggott to Easton, earth-work 29 cents, tuft sodding 1 1/2 cents, solid sodding 3 cents. J. L. Perkins, Riverton, Miss., Riverton to Hughes, earth-work 23 cents, tuft sodding 1 cent, solid sodding 9 cents; Clay and Baggott to Easton, no bid. William C. P. Jones, Rosedale, Miss., Riverton to Hughes, earth-work 22 cents, tuft sodding 1 cent, solid sodding 3 cents; Clay and Baggott to Easton, no bid. L. C. Dulaney, Rosedale, Miss., Riverton to Hughes, no bid; Clay and Baggott to Easton, earth-work 23 cents, tuft sodding 1 cent, solid sodding 9 cents. Absolom F. Bray, Memphis, Tenn., Riverton to Hughes, earth-work 24 1/4 cents, tuft sodding 1 1/4 cents, solid sodding 13 cents; Clay and Baggott to Easton, earth-work 24 1/4 cents, tuft sodding 1 1/4 cents, solid sodding 13 cents. Contract awarded to W. C. P. Jones for work from Riverton to Hughes, and to L. C. Dulaney from Clay and Baggott to Easton.

COURT-HOUSE, POST-OFFICE, ETC., JACKSON, TENN.—Synopsis of bids for iron columns, etc., opened November 1: S. M. Morris, \$1,587.39; McHose & Lyon, \$1,125; Sneed & Co. Iron-Works, \$1,417.

DEER ISLAND HOSPITAL.—J. Sears, \$65,400; Hiram Ames, \$59,734; Andrew Anderson, \$52,000; J. McNamara, \$49,524; N. S. Wilbur, \$48,918; Woodbury & Leighton, \$48,775; J. Rawson, \$48,469; McNeil Brothers, \$46,990; A & J. McLaren, \$46,800; E. Shapleigh, \$45,359; J. C. Hosmer, \$44,040; Creesy & Noyes, \$44,037; Hamilton & Parks, \$42,833; William J. Jobling, \$40,630; C. J. Carmody, \$28,838. The contract was awarded to William J. Jobling.

CUSTOM-HOUSE AND POST-OFFICE, MEMPHIS, TENN.—Synopsis of bids for joiner's work and wood flooring, opened October 20:

WOOD FLOORING.	Additional flooring per square of 100 feet.			
		Time to Complete.	Amount.	
		7 mos.	7 mos.	12 mos.
JOINER'S WORK.	White Pine and Bird's-Eye Maple.	\$36,666	39,285	42,500
	White Pine and Cherry.	\$26,944	33,000	31,559
	White Pine and Oak.	\$25,444	29,330	29,607
	White Pine and White Oak.	\$6,444	30,996	30,959
		Paradise & Young, Memphis, Tenn.	A. H. Andrews & Co., Chicago, Ill.	Mitchell Fur Co., Cincinnati, Ohio.

Paradise & Young's bids for joiner's work, white pine and cherry, and for flooring have been accepted.

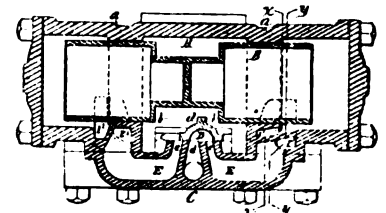
ABSTRACT of proposals for dredging and furnishing piles, lumber, gravel, brush, etc., for the improvement of the Appomattox River, Virginia, opened October 23, 1884, by Capt. F. A. Hinman: Wm. F. Gatling, gravel, 46c. per cubic yard; brush, \$1.44 per pile; binding-poles, 4 1/2 c. each. A. F. Hall, dredging, per cubic yard, 13 1/4 c.; P. Sanford Ross, 14 1/2 c.; Morris & Cummings Dredge Co., 25c.; Thos. P. Morgan, 13 1/2 c.; James Cater & Son, 29c. Simon West, \$1.05 per pile. Contract for dredging awarded to A. F. Hall; bids on piles and gravel rejected as excessive; contract for brush and binding-poles awarded to William F. Gatling.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

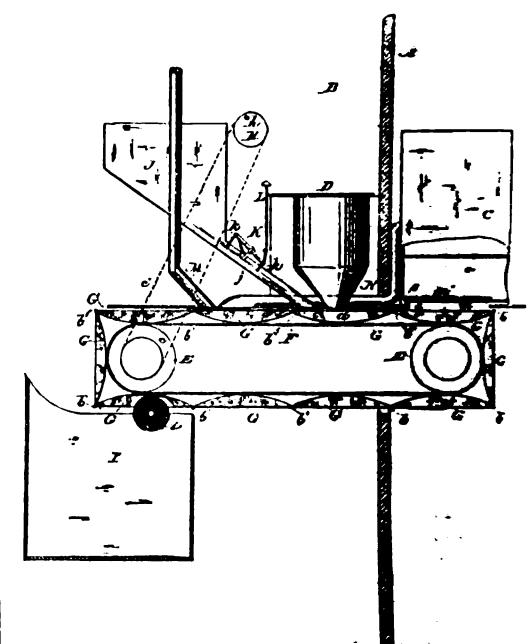
Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

229,218. WATER-METER. Benaiah Fitts, Worcester, Mass., assignor to the Union Water-Meter Company, same place. Filed August 25, 1881. (Model.) Issued May 25, 1884.



Claim.—The combination of the cylinders A A', having internal bearing-surfaces, a a', said cylinders being separated below by a triangular-shaped space, the pistons B B', provided with shoulders b b', the removable valve-seat plate C, having guide-ways c c' and ports c c', and the valves D D', provided with projections d d', the valve-seat ports being connected with the ends of the cylinders by straight parallel passages E E', located in the ends of the valve-seat plate, and spirally-crossed passages F F', located in the triangular space beneath the cylinders, substantially as shown and described.

229,228. DRY-CLOSET. Thomas W. Jackson, San Francisco, Cal. Filed December 17, 1883. (No model.) Issued May 27, 1884.



Claim.—1. In a dry-closet apparatus, an endless receptacle-belt mounted under and adapted to receive the excrement or feces from a closet, means for depositing therein a charge of ashes, sand, earth, or other suitable or similar substances, means for introducing hot air upon the contents of the receptacle to dry it, and a mechanism for causing the movement of said endless receptacle to carry off and discharge its contents, substantially as and for the purpose herein described.

2. In a dry-closet apparatus, a stove or other fuel-consuming device and an adjoining closet, in combination with an endless-receptacle belt mounted under said stove and closet, and adapted to receive the ashes from the former and the excrement or feces from the latter, and a mechanism for causing the movement of said endless receptacle to carry off and discharge its contents, substantially as herein described.

3. In a dry-closet apparatus, a stove or other fuel-consuming device and an adjoining closet, in combination with an endless-receptacle belt mounted under said stove and closet, and adapted to receive the ashes from the former and the excrement or feces from the latter, a hot-air pipe communicating with the stove and with the receptacle-belt to dry its contents, and a mechanism for causing the movement of the belt to carry off and discharge its dried contents, substantially as herein described.

4. In a dry-closet apparatus, the stove C, having ash-pit c, and the closet-seat D, in combination with the underlying endless-belt F, mounted on drums E, the succession of separate pans G on said belt, and adapted by its movement to be brought successively under the ash-pit of the stove and under the discharge of the closet-seat, a means automatically depositing a charge of ashes in each pan when under the ash-pit, and a mechanism for causing a periodic movement of said belt to carry a pan from under the closet and substitute a fresh one, substantially as herein described.

5. In a dry-closet apparatus, the stove C, having an ash-pit c, with a grated double bottom consisting of a stationary plate a', and sliding-plate a'', having arm b, and returning-spring s, in combination with the endless periodically-moving belt F, having pans G, each pan having a raised cam portion, b', for engaging with the arm b of the sliding grate-plate a', to cause a discharge of ashes into the pan, substantially as and for the purpose herein described.

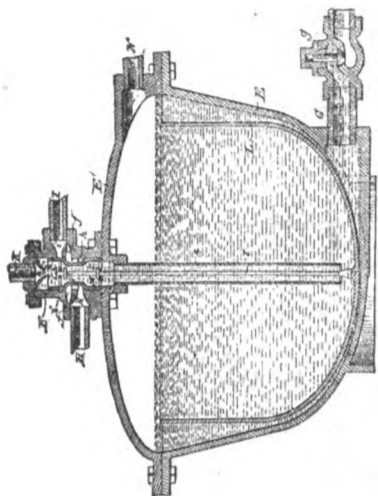
6. In a dry-closet apparatus, the stove C, having an ash-pit c, and the closet-seat D, in combination with the underlying endless-belt F, mounted on drums E, the succession of separate pans G on said belt, and

adapted by its movement to be brought successively under the ash-pit of the stove and under the discharge of the closet-seat, and the means for causing the periodic movement of the belt and pans, consisting of the pulley *e* on drum *E*, the crank-pulley *H*, and the belt *e'*, arranged to operate substantially as and for the purpose herein described.

7. In a dry-closet apparatus, the stove *C*, having an ash-pit *c*, and the closet-seat *D*, in combination with the periodically-moving endless belt *F*, having pans *G*, arranged with relation to the stove and closet, as described, the hot-air pipe *N*, communicating with the stove and pans, and the vent-pipe *M*, substantially as and for the purpose herein described.

8. In a dry-closet apparatus, the endless belt *F*, adapted to be rotated, and having pans *G*, for the purpose described, in combination with the brush *i*, over which the returning inverted pans pass, whereby they are cleansed, substantially as herein described.

800,008. STEAM-TRAP. Eugene F. Osborne, St. Paul, Minn. Filed March 2, 1883. (No model.) Issued June 10, 1884.



Claim.—1. The combination, with a steam-supply pipe and a source or means of water-supply, of a closed chamber constructed to receive water by gravity, and provided with an exit therefor, automatic means constructed to alternately admit steam from said supply-pipe to said chamber and cut it off therefrom, and automatic means constructed to close said water-exit simultaneously with the cutting off of the supply of steam to the chamber, whereby the water is alternately allowed to flow into the said chamber and forced therefrom by steam-pressure, substantially as described.

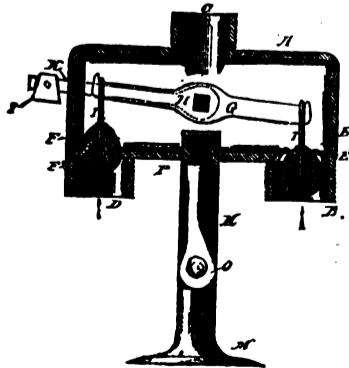
2. The combination, with a steam-supply pipe and a pipe communicating with a source or means of water-supply, of a closed chamber having a water-inlet provided with an inwardly-opening check-valve, a water-exit, and a steam-exit, automatic means for alternately admitting steam from said supply-pipe to said chamber and cutting it off therefrom, and automatic means for closing said water-exit and opening said steam-exit during the time that communication between the steam-supply pipe and the chamber is interrupted, substantially as described.

3. The combination, with a steam-supply pipe and a pipe communicating with a source or means of water-supply, of a closed chamber having a water-inlet passage provided with an inwardly-opening check-valve, a water-exit and a steam-exit, valves for controlling the admission of steam from the supply pipe to said chamber and for controlling the said water and steam exits, and a float connected with said valves and operating to alternately admit steam from said pipe to said chamber and to exclude it therefrom, and to close said water-exit and open said steam-exit during the time that the steam-inlet is closed, substantially as described.

4. The combination, with a tank containing water under steam-pressure and a steam-supply pipe which is independent of said tank, of a chamber constructed and arranged to receive water from the tank by gravity, and provided with a suitable automatic valve in the inlet-pipe for preventing the backward flow of water therein, and with a water-exit, automatic means for alternately admitting steam from said supply-pipe to said chamber and cutting it off therefrom, automatic means for closing the said water-exit, and automatic means for equalizing the pressure between the said tank and the said chamber during the time that the communication between said supply-pipe and said chamber is closed, substantially as described.

5. The combination, with the closed receptacle *E*, having a water-inlet provided with a check-valve, of the float *L*, the valve-casing *F*, communicating with the top of the receptacle, and provided with passages *k*, *k'*, and *j*, the tube *e*, the valve *M*, and the rod *i*, secured to said float and provided with the valve *k'*, substantially as and for the purpose set forth.

800,888. STOP AND WASTE COCK. Owen J. McGann, Pullman, Ill., assignor of one-half to John M. Vandermark, same place. Filed November 14, 1883. (No model.) Issued June 17, 1884.

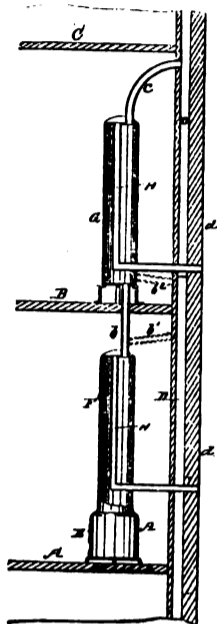


Claim.—1. In a stop and waste cock, the shell constructed to connect with the service and waste pipes, and having two of its ports and valve-seats thereat at

one of its sides, in combination with a pair of valves respectively opening into the service and waste pipes, and having their stems respectively connected with opposite ends of an oscillatory lever, which said valves are arranged so that while susceptible of moving in unison to simultaneously open one and close the other of said ports, they shall alternately open in one and the same direction away from their seats, and outwardly from the shell, substantially as described.

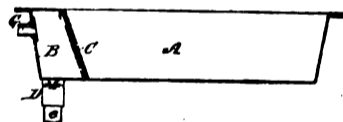
2. In a stop and waste cock, the shell constructed to constitute a joint in the service-pipe, and provided with a valve apparatus for opening and closing its ports, in combination with a jointed support for the shell, consisting of a leg composed of two members, one being connected with the shell, the other provided with a perforated base-plate, and both being pivoted together to form a hinge-joint in the leg, whereby the shell can be set at various angles, substantially as described.

800,078. HEATING AND VENTILATING DEVICE FOR BUILDINGS. Amanda M. Hicks, Clinton, and Alonzo Dishman, Paducah, Ky. Filed July 16, 1883. (No model.) Issued June 10, 1884.



Claim.—The combination of the stove *E*, with its drum *F* on the lower floor, *A*, of a building, one or more upper drums, *G*, on the floor or floors above, pipes or ducts connecting the upper portion of each under drum with the lower portion of the drum on the next floor above it, the escape-pipe *c* for the gaseous products of combustion, the chimney *D* of the building, and the independent air-supply pipes *H*, arranged one above the other within the drums and through the chimney to the external atmosphere, and open at their upper or inner ends to the rooms containing the drums, essentially as shown and described, and for the purposes set forth.

800,180. SINK. Charles T. Regan, Brooklyn, N. Y. Filed December 3, 1883. (No model.) Issued June 10, 1884.



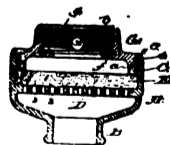
Claim.—1. The combination, with a sink or vessel, of a compartment for the reception of sewer-gas, arranged within the sink, and a pipe or passage for conducting away the gas which may arise within the chamber or compartment, substantially as shown and described.

2. The combination, in a sink or other like vessel, of a cap or cover, *a*, at one end, and a slide or door for separating the sink into an open and a closed compartment, the closed compartment being provided with exit-pipes for the discharge of water and gas, respectively, as specified.

3. The combination, in a sink having outlet *G*, of a ledge or cover, *a*, and a slide, having serrations or perforations, as described, whereby a closed chamber or compartment for the reception of sewer-gas is produced, and the matter which passes from the open to the closed compartment is strained, as described.

800,867. FILTER. Benjamin Holland, Jr., Providence, R. I., assignor of one-half to Thomas S. Nowell, Boston, Mass. Filed July 16, 1883. (No model.) Issued June 17, 1884.

Brief.—The part *E* is composed of felt.



Claim.—The combination and arrangement, substantially as shown and described, in a filter, of the shell *A*, having the internal foraminous shelf, *D*, cast therewith and forming chambers above and below the shelf, the attaching cap or cover *G*, screw-threaded to engage an internal screw-thread in the shelf to connect the two, and the disk of felt or textile filtering substance *E*, supported by the said shelf, and held in place by the said cap or cover screwed down upon it, as set forth.

299,280. INJECTOR. Franklin W. Kremer, Wadsworth, O. Filed November 19, 1883. (Model.) Issued May 27, 1884.

800,092. INJECTOR. John Loftus, Albany, N. Y., assignor of two-thirds to George W. Richardson, Boston, Mass. Filed September 11, 1883. (Model.) Issued June 10, 1884.

800,207. STEAM-HEATER. William C. Bronson, Saratoga Springs, N. Y. Filed January 18, 1884. (No model.) Issued June 10, 1884.

English Patents.

892. IMPROVEMENTS IN SPIRAL UP-DRAUGHT EXHAUST CHIMNEY-COWL AND ROOF-VENTILATOR.

FIG. 1.

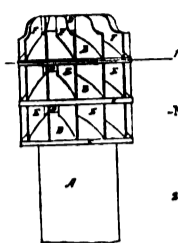
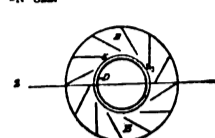


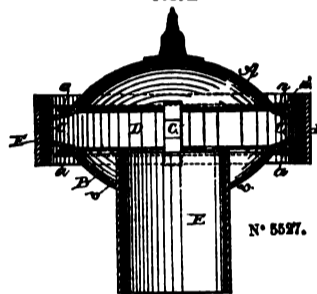
FIG. 2.



The invention relates to apparatus to be applied to the upper part of chimney and ventilating shafts, for increasing up-draught and preventing down-draught. Arthur Charles Smith, of 114 Wells Street, Camberwell, in the county of Surrey. Prov. spec. January 5, 1884. Letters patented June 3, 1884. (Price 6d.)

8,527. IMPROVEMENTS IN VENTILATORS AND CHIMNEY-COWLS. A communication from Andrew Jackson Robinson, a person resident at Boston, in the State of Massachusetts, United States of America.

FIG. 1.



This invention relates to ventilators and chimney-cowls, and comprises the peculiar construction of the cap or head for a ventilating-shaft or chimney-top, as described in the specification.

John Henry Reynolds, of Troy, in the county of Rensselaer and State of New York, United States of America. Prov. spec. November 26, 1883. Letters patented June 7, 1884. (Price 6d.)

BOOKS RECEIVED.

SANITARY QUESTION. By William Paul Gerhard, C. E. Reprint from "Cottages, or Hints on Economical Building." 8vo. 54 pages. Illustrated.

REPORT ON THE MARTINVILLE SEWER. By Horace Andrews, Jr., C. E. Extract from Fifth Annual Report of the New York State Board of Health. 8vo. 28 pages. With maps.

PROCEEDINGS OF THE ENGINEERS' CLUB, OF PHILADELPHIA. Vol. IV. No. 3. With Supplement.

THAMES POLLUTION. Copies or extracts of correspondence, presented to the House of Commons, and ordered to be printed. London: Henry Hansard & Son. 1884.

FORTY-SECOND REPORT TO THE LEGISLATURE OF MASSACHUSETTS, relating to the Registry and Returns of Births, Marriages, and Deaths in the Commonwealth, for the year ending December 31, 1883. Boston: Wright & Potter Printing Company.

ANNUAL REPORT OF THE OPERATIONS OF THE UNITED STATES LIFE-SAVING SERVICE, for the fiscal year ending June 30, 1883. Washington: Government Printing Office, 1884. 519 pages, with Illustrations.

EXCERPT MINUTES OF PROCEEDINGS OF THE INSTITUTE OF CIVIL ENGINEERS: Light-House Apparatus for Dipping Lights, Alan Brebner, Jr., B. S. C., M. Inst. C. E.; Coaling at the Nine Elms Gas-Works, Robert Morton, M. Inst. C. E.; Sewering of Towns on the Separate System—Size and Inclination of Sewers, Alfred Edward White, Assoc. M. Inst. C. E.; Antiseptic Treatment of Timber, Samuel Bagster Boulton, Assoc. M. Inst. C. E.

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *bs dwell*, brown-stone dwelling; *apart house*, apartment-house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

48th st, s s, 300 w 10th av, 5-story br factory; cost, \$30,000; o, Chas. Lesinsky; a, Berger & Baylies; b, Gustav Staiger.

421 E 75th st, 5-story br ten; cost, \$18,500; o, Eva Mueller; a, John Brandt.

106th st, n s, 150 w 9th av, 5-story b s front ten; cost, \$24,000; o, Wm. B. Pettit; a, A. B. Ogden & Son; b, day's work.

128th st, n s, 150 e Lexington av, 6-story br factory; cost, \$30,000; o, J. J. Nestall; a, A. B. Ogden & Son. Broadway to 7th av, 80 s 53d st, 1-story br skating rink; cost, \$16,000; lessee, Fred R. Fortmeyer.

BROOKLYN.

Union st, s w cor 7th av, 3-story and bmt livery stable; cost, \$10,000; o, B. C. Hollingsworth; a, Francis Ryan; b, Matthew Ryan.

1st st, e s, 60 s South 2d st, 3 5-story br sts and tens; cost ea, \$10,000; o, Chas. J. Dodge; a, E. F. Gaylor; b, James Rodwell and Marinus G. Gill.

McDonough st, s s, 325 w Reid av, 4-story fr ten; cost, \$10,000; o, Charles Robins; a, Amzi Hill.

Baltic st, n s, 350 e Smith st, 2 3-story br tens; cost ea, \$5,000; o, Mary E. Lynch; a, I. D. Reynolds; b, John McLean.

Macon st, s s, 200 e Tompkins av, 5 2-story and bmt b s dwells; cost ea, \$4,500; o, Emma L. Turner; b, Albert Wilkinson.

Court st, e s, 33 n 3d pl, 4-story br st and flats; cost, \$9,500; o, Wm. H. Middendorf; a, J. W. Bailey; b, J. Kolle and Wm. C. Anderson.

Willoughby av, s e cor Grand av, 2 4-story b s, one store and flat; cost, \$11,000 and \$9,500; o, T. H. Robbins; a, Amzi Hill; b, E. K. Robbins.

ALTERATIONS, NEW YORK.

503-505 Broadway, put in passenger elevator; cost, \$5,000; o, Joseph F. Loubat; a, John B. Snook; b, not selected.

113th st, s s, 50 w 1st av, 2-story br enten; cost, \$7,000; o, John Dwight and John R. Maurice; a, J. W. Davidson; b, J. & W. C. Spears and R. Thompson.

176 Duane st, repair damage by fire; cost, \$5,000; o, Lorillard estate, J. M. Jackson, agent; b, John Porter and M. H. Berry.

(Continued on page 564.)

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopoeial requirements.

We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

W. H. SCHIEFFELIN & CO.

New York:
175 WILLIAM STREET.

OFFICE OF

The New York Mutual Gas-Light Company,

36 UNION SQUARE,

Fourth Avenue and Sixteenth Street. P. O. Box 57.

NEW YORK, November 11, 1884.

TO THE CONSUMERS OF GAS.

On and after this date the price of gas supplied by this company will be as follows:

To all consumers of less than one hundred thousand cubic feet per month, \$1.75 per thousand feet.
To all consuming one hundred thousand feet and over per month, \$1.50 per thousand feet.

JOHN P. KENNEDY, President.
W. C. BESSON, Secretary.

OFFICE OF THE

CONSOLIDATED GAS COMPANY OF NEW YORK,
No. 4 IRVING PLACE, Nov. 11, 1884.

TO THE CONSUMERS OF GAS.

On and after this date the price of gas supplied by this company will be as follows:

To all consumers of less than one hundred thousand cubic feet per month, \$1.75 per thousand feet.
To all consuming one hundred thousand cubic feet and over per month, \$1.50 per thousand feet.

CHARLES ROOME, President.
H. E. GAWTRY, Secretary.

Index to European Advertisements.

CRAIG, J. & M., Kilmarnock (near Glasgow), Scotland. Grease-Traps. P. 565.

CAPPER, SON & CO., London, Eng. The "Twin-Basin" Water Closet. P. 565.

DOULTON & CO., London, Eng. Sanitary Specialties. P. 565.

HARTSHILL BRICK AND TILE CO., Stokes-on-Trent, Eng. Tiles. P. 565.

HOUGHTON & CO., London, Eng. Sanitary Specialties. P. 565.

HYGIENIC AND SANITARY ENGINEERING CO. (LIM.), London, Eng. Sanitary Specialties. P. 564.

JOHNS, EDWARD, Rugeley, Eng. Plumbers' Earthenware. P. 565.

KEITH, JAS., London, Eng., and Edinburgh, Scotland. Heating and Ventilating. P. 565.

KING, P. S., & SON, London, Eng. Publishers and Booksellers. P. 564.

LIEBIG CO. Extract of Meat. P. 565.

POPLEWELL, COLTON & CO., London, Eng. Patent Agents and Consulting Engineers. P. 564.

SMALPAGE & SON, London, Eng. Tailors. P. 564.

THE LANGHAM HOTEL, London, Eng. P. 564.

THE NORTH BRITISH RUBBER CO. (LIM.), Edinburgh, Scotland. Rubber for Sanitary Purposes. P. 564.

WOODWARD, JAS. Swadlow, near Burton-on-Trent, England. Sanitary Specialties. P. 565.

BUILDING INTELLIGENCE.

(Continued from page 563.)

KANSAS CITY, MO.—N w cor 12th and Walnut sts; store; cost, \$10,000; o, Downs & Cowhead.
N w cor 14th and Central sts, 2 dwells; cost, \$9,500; o, A. D. Smith; a, S. E. Chandelier.

PHILADELPHIA, PA.—Barnwell, bet Lombard and South sts, 4 2-story dwells; o, John Devlin.
Snyder av, bet 9th and 10th sts, 5 2-story dwells; o, Jos. Stuckey.

19th st, s of Federal, 9 3-story dwells; o, Thomas Marshall.
Dorr st, e of 4th, 4 2-story dwells; o, Martin Thomas.

S e cor Township line and Rittenhouse sts, 2 dwells; b, Alfred Ancott.
Hope st, n of Cambria, 10 2-story dwells; o, John Loughran.

5th st, n of Somerset, 7 2-story dwells; o, W. H. Greenfield.
3612-20 Lewis st, 5 2-story dwells; o, James H. Billington.

6th st, n of Callowhill, 2 dwells; b, H. Pettit.
Bringinghurst st, bet Wakefield and Germantown R. R., 2 dwells; b, B. L. Collam.

PHILADELPHIA, PA.—S W cor Hancock and High sts, 2 3-story dwells; o, John B. Betts.
Wishart st, bet Frankford rd and Emerald st, 6 2-story dwells; o, Alex. T. Richards.

Tasker, bet 19th and 20th sts, 5 2-story dwells; o, M. B. Stackhouse.
Cedar st, s of Lehigh av, 6 2-story dwells; o, W. H. Abbott.

N w cor Lawrence and Cambria sts, 2 dwells; o, W. Kurtz.
Turner, bet Erie and Butler sts, 5 2-story dwells; o, Frederick Warner.

Wright, w of 25th st, 13 3-story dwells; o, James Caven.
Germantown, bet Chestnut and Sunset avs; stone church; b, Jacob Whylic.

Mifflin, bet 6th and 7th sts, 4 2-story dwells; b, W. Merrick.
Branch, bet 3d and 4th sts, br fire truck-house; b, C. O. Neill.

13th st, bet Ellsworth and Washington avs; school-house, 45x88; b, C. O. Neill.

SAGINAW CITY, MICH.—Spier & Rohns, architects of Detroit, have made plans for a dwelling for C. H. Davis, to cost \$15,000.

WASHINGTON, D. C.—Mass av, bet 13th and 14th sts; 3-story br res; cost, \$15,000; o, Chas. A. James; a, Gray & Page; b, M. M. Magruder.

Cor K and 16th sts, 3-story br res; cost, \$14,500; o, Lucy J. Wheeler; a, A. H. Dodd; b, Daring & Johnson.

New York av, bet 9th and 10th sts, 3-story br res; cost, \$8,000; o, Wm. Halen; a, C. A. Didden; b, S. Phillips.

Cor 18th and N sts, br church; cost, \$21,600; o, Trustees Presbytery; a, Bright & Humphreys.

WASHINGTON, D. C.—Mass av, bet 7th and 8th sts, 3-story and cellar br dwell; cost, \$8,000; o, B. F. Leighton and C. K. Foss; a, J. J. Germiller.

New Jersey av, bet R st and R. I. av, br dwell; cost, \$10,000; o, a, and b, B. F. Goff.

WORCESTER, MASS.—Elm st, alteration of church; cost, \$6,000; o, Unitarian Society; a, A. P. Cutting; b, Cutting & Bishop.

Lincoln st, fr dwell; cost, \$12,000; o, Job A. Turner; a, Hartwell & Richardson; b, C. A. Vaughan.

Main st, fr dwell; cost, \$7,500; o, H. L. Stockwell; a, A. P. Cutting; b, L. T. Houghton.

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HARBOR.

UNITED STATES ENGINEER OFFICE,
1125 Girard Street,
PHILADELPHIA, PA., October 16, 1884.

Sealed proposals, in triplicate, will be received at this
office until 12 o'clock M., of Saturday, November 15,
1884, and opened immediately thereafter, for 23,000 tons
of stone, more or less, to be used in the construction of
the Delaware Breakwater Harbor.

For blank forms, specifications, etc., apply at this
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W. H. HEUER,
Maj. of Engineers, U. S. A.

PROPOSALS FOR MARBLE TILING AT
KANSAS CITY, MO.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 1, 1884.

Sealed proposals will be received at this office until 2
P. M. on the 22d day of November, 1884, for furnish-
ing and laying all the marble tiling required in the Custom
House and Post-Office building at Kansas City, Mo., in
accordance with the drawings and specification, copies of
which and any additional information may be had on applica-
tion at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and
those received after the time of opening will not be
considered.
M. E. BELL,
Supervising Architect.

PROPOSALS FOR STONE AND BRICK WORK
AT DALLAS, TEX.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 1, 1884.

Sealed proposals will be received at this office until 2
P. M. on the 18th day of November, 1884, for all the
labor and materials, stone, brick, mortar, etc., and build-
ing complete the basement and area walls of the Court-
House, Post-Office, etc., building at Dallas, Tex., in
accordance with the drawings and specification, copies of
which and any additional information may be had on applica-
tion at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and
those received after the time of opening will not be
considered.
M. E. BELL,
Supervising Architect.

PROPOSALS FOR SEWERS, AT NEWARK, N. J.

OFFICE OF THE STREET COMMISSIONER,
NEWARK, N. J., November 8, 1884.

Sealed proposals will be received at this office until 4
P. M., November 20, 1884, for constructing a sewer or
conduit from Peddie Street to and into the Newark Bay,
and the furnishing of all material and labor necessary for
the completion of the same.

The following is about the amount of work to be done:
Section 1. 7,800 lineal feet of sewer.
Section 2. 6,350 lineal feet of sewer.
Section 3. 340 lineal feet of sewer; 40x70 feet of founda-
tions.

Section 4. 9,500 lineal feet of timber conduit.
Section 5. 2,000 lineal feet of timber conduit.

Bidders will state their prices in writing, as well as in
figures.
Bidders must specify in their proposals that, should
the above work be awarded to them, they will bind them-
selves to finish and complete the same by or before
the first day of January, 1887.

The plans and specifications of the work can be exam-
ined at the office of the engineer. Said proposals to be
accompanied by the consent, in writing, of two sureties,
who shall, at the time of putting in such proposals, qual-
ify as to their individual responsibility, to the amount
of the contract, and bind themselves that, if the
contract be awarded to the person or persons making
the proposal, they will, upon its being so awarded, be-
come as his or their sureties for the faithful performance
of said work, and that if the person or persons omit or
refuse to execute such contract, they will pay to the
city of Newark any difference between the sums to
which he or they would have been entitled upon the
completion of the contract and that which the city of
Newark may be obliged to pay the person or persons by
whom such contract shall be executed.

The Committee on Sewers and Drainage reserve to
themselves the right to reject any or all proposals for
the above work, as they may deem best for the interest
of the city.

By direction of the Common Council,
HENRY D. DUNN,
Chairman of Sewers and Drainage Committee.
WILLIAM ALLEN,
Street Commissioner.

PROPOSALS FOR DREDGING.

UNITED STATES ENGINEER OFFICE,
2107 Pennsylvania Avenue,
WASHINGTON, D. C., October 30, 1884.

Sealed proposals for Dredging in St. Jerome's Creek
and Breton Bay, Md., will be received at this office
until 1 P. M., on November 20, 1884, and opened im-
mediately thereafter.

Specifications containing detailed information, and
blank forms of proposals can be obtained at this office.
The right to reject any or all proposals is reserved.

S. T. ABERT,
U. S. Civil Engineer.

PROPOSALS FOR POROUS TERRA-COTTA
TILE FOR ROOFS, AT BUFFALO, N. Y.,
AND TOLEDO, OHIO.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 7, 1884.

Sealed proposals will be received at this office until 2
P. M. on the 22d day of November, 1884, for furnishing
the porous terra-cotta tiles for the roof of the Custom-
House, etc., buildings at Buffalo, N. Y., and Toledo,
Ohio, estimated as follows:

4,500 superficial feet at Buffalo, N. Y.; 13,000 superfi-
cial feet at Toledo, Ohio, in accordance with drawings
and specification, copies of which and any additional
information may be had on application at this office or
the office of the superintendent at each building.

Bids must be accompanied by a certified check, and
those received after the time of opening will not be
considered.
H. G. JACOBS,
Acting Supervising Architect.

PROPOSALS FOR SAFES AND VAULTS FOR
THE U. S. TREASURY DEPARTMENT.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 23, 1884.

Sealed proposals will be received at this office until 2
P. M. on the 25th day of November, 1884, for supplying
the burglar-proof safes and chests, fire and burglar safes
combined, fire-proof safes, fire-proof doors, shell-safes,
and single and double steel-lined vault-work required by
the Treasury Department, and as may be ordered during
the fiscal year ending June 30, 1885, in accordance with
drawings and specification, copies of which and any
additional information may be had on application at
this office on and after November 5, 1884.

Bids must be accompanied by a certified check, and
those received after the time of opening will not be con-
sidered.
M. E. BELL,
Supervising Architect.

GREAT KANAWHA RIVER IMPROVEMENT.
PROPOSALS FOR THE IRON-WORK IN THE
FOUNDATIONS OF DAM NO. 6.

UNITED STATES ENGINEER OFFICE,
378 St. Paul Street,
BALTIMORE, MD., October 30, 1884.

Proposals for iron-work in the foundations of a Move-
able Dam, at Lock No. 6, on the Great Kanawha River,
West Virginia, about four miles below Charleston, will
be received at the U. S. Engineer Office, Charleston,
Kanawha County, West Virginia, until noon of Decem-
ber 2, 1884, and opened immediately thereafter.

Blank forms, specifications, and any desired informa-
tion can be had upon application to Mr. A. M. SCOTT,
Assistant Engineer at that office.

WM. P. CRAIGHILL,
Lt.-Col. of Eng'rs, U. S. A.

PROPOSALS FOR STONE AND BRICK WORK
AT JEFFERSON CITY.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 1, 1884.

Sealed proposals will be received at this office until 2
P. M. on the 18th day of November, 1884, for all the
labor and material, stone, brick, mortar, etc., and build-
ing complete the basement walls of the Court-House,
Post-Office, etc., building at Jefferson City, Mo., in
accordance with the drawings and specification, copies of
which and any additional information may be had on applica-
tion at this office or the office of the superin-
tendent.

Bids must be accompanied by a certified check, and
those received after the time of opening will not be
considered.
M. E. BELL,
Supervising Architect.

Dredging in (1) Wilmington Harbor and (2) Wicomico
River, Md. Until November 27. Address WILLIAM F.
SMITH, U. S. Agent, U. S. Engineer Office, Wilming-
ton, Del.

Breakwater at Dunkirk, N. Y. Until November 15.
Address CAPT. EDWARD MAGUIRE, U. S. A., Engineer
Office, Buffalo, N. Y.

Construction of brick chimneys at Cape Henry, False
Cape, Caffey's Inlet, Nag's Head, Chicomicomico, Dam
Neck Mills, Whale's Head, Kitty Hawk, Oregon Inlet,
Little Kinnakeet. Address Supt. SIXTH LIFE-SAVING
DISTRICT, Manteo, N. C.

Dredging in Susquehanna River, Md. Until Novem-
ber 15. Address WILLIAM F. SMITH, U. S. Engineer
Office, Wilmington, Del.

Remodeling a building into a barracks. Until No-
vember 15. Address Lieut. SEBREE SMITH, U. S. A.,
Washington Barracks, D. C.

Constructing ice-piers on the Great Kanawha River,
near Point Pleasant, W. Va. Approximate quantities
of material required: 204,472 feet B. M. oak timber,
9,536 pounds of iron drift-bolts, 2,486 cubic yards of
rip-rap stone. Until December 8. Address Lieut.-Col.
WILLIAM E. MERRILL, U. S. A., Engineer Office, Cin-
cinnati, O.

(1) Driving piles and constructing jetties at Volusia
Bar, Fla. (2) Making a cut through neck at Devil's
Elbow, Upper St. John's River, Fla. Until November
24. Address CAPT. WILLIAM T. ROSSELL, U. S. A.,
Engineer Office, Jacksonville, Fla.

Belting, files, tool-steel, pine and bay-wood, stationery,
etc., for the Bureau of Ordnance. Until November 22.
Address THOMAS H. LOOKER, Pay Director, U. S. N.,
Navy Pay Office, Washington, D. C.

Materials and labor for brick school-house in sub-
district No. 9, Madison township, O. Until November
22. Address A. M. SEUTER, Township Clerk, Grove-
port, O.

Furnishing pine and hemlock timber for breakwater
construction at Chicago, Ill. (about 2,167,000 feet B. M.)
Until December 9. Address Maj. W. H. H. BENYARD,
U. S. A., Engineer Office, 25 Honore Building, Chi-
cago.

Dredging and rock excavation in Caloosahatchie
River, Fla., Suwanee River, Fla., and Harbor at Cedar
Keys, Fla. Bids must be separate for each work. Until
November 18. Address CAPT. WILLIAM T. ROSSELL,
U. S. Engineer Office, Jacksonville, Fla.

Erection of brick court-house, stone facing, 40'x75',
tower. Architect, J. F. Schneider, 933 F Street, N. W.
Washington, D. C. Until November 24. Address L.
S. WALKER, Clerk of Board of Supervisors of Shenan-
doah County, Woodstock, Va.

The municipality of the city of New Westminster are
prepared to offer the sum of \$50,000 as a bonus to any
person or company that will build, maintain, and run a
railway from the city of New Westminster to the Cana-
dian Pacific terminus at Port Moody. Said offers to be
sent into this office on or before the last day of Novem-
ber, 1884. By order, A. J. ALPORT, C. M. C., City
Clerk's Office, New Westminster, B. C.

Building iron screw-steamer for Light-House Board.
Until December 1, 1884. Address S. C. ROWAN, Vice-
Admiral, U. S. N., Chairman, Office of the Light-House
Board, Washington, D. C.

Building new city-hall at Richmond, Va. Until De-
cember 1. Address W. E. CUTSHAW, City Engineer.

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LONDON, October, 1883.

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International Health Exhibition, Class 23—508

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CHOLERA.

THE hope that the epidemic of cholera in Southern Europe was dying out, and would soon totally disappear, is destroyed by recent news from Paris, where the disease seems to have obtained a foothold, and where the prospect of its spread is discouraging, in view of the pollution of the water-supply, as indicated in the recent report of Dr. Daremberg.

The recommendations of Dr. John H. Rauch, the Secretary of the Illinois State Board of Health, contained in the paper entitled "Practical Recommendations for the Exclusion and Prevention of Cholera," which he read at the recent conference of State Boards of Health at St. Louis, and the "Report on the Prevention of Epidemic Cholera in America," adopted by the American Public Health Association and the conference of State Boards of Health, and just issued as a circular, are therefore timely and important documents, which we regret that we are unable to publish in full, owing to great press of matter. The report adopted by the association and conference advises "that the general Government should maintain such a national health service as shall, by rigid inspection at the port of embarkation, question the freedom from disease and infection of all persons and things from infected districts, and shall secure the surveillance of such persons and things while on shipboard, and, when necessary, detention at quarantine stations on this side for treatment and disinfection."

To this end it was urged upon Congress "to provide for the appointment and maintenance at all such foreign ports where cholera, yellow fever, plague, small-pox, or scarlet fever exists, or are liable to exist, of medical officers of health, the same being either accredited consuls, or attached to the consulates."

The inclusion of all ports at which either small-pox or scarlet fever exist, or are liable to exist, would make this a very extensive organization, and would cover almost all European and Asiatic ports. The inspection and quarantine service inaugurated by the National Board of Health, as described in the paper read by Dr. Smart before the conference, is declared to meet with cordial approval, and Congress is urged to appropriate funds for carrying it out, as also for stamping out the disease if it appears in any locality; \$500,000 is asked for the latter purpose.

Dr. Rauch's paper is a forcible presentation of the arguments in favor of establishing such a system of inspection and quarantine as is proposed in the circular. He says: "It may be entirely true that, if all our food-supplies were wholesome, and our water-supplies not only unpolluted but unpollutable; if sewage and refuse disposal were prompt and complete; if our cities, towns, and villages were all models of sanitary perfection, and their inhabitants free from predisposition or susceptibility, acquired or inherited; in short, if there were no ignorance, nor poverty, nor filth, nor infirmity in the land, we might dispense with precautions against the introduction of disease." But in view of the present condition of affairs, he concludes that it is nonsense to talk about relying on local sanitation to combat cholera. He considers it to be a pre-eminently quarantinable disease, so far as this country is concerned, claiming that no sin-

gle case has ever succeeded in establishing an epidemic here—that successive and repeated importations have always occurred before it has effected a lodgment. A national health organization is a necessity to carry out a useful system of quarantine, and Dr. Rauch thinks that the membership of the National Board of Health "should be enlarged so as to more perfectly represent the natural sanitary areas, and its members should be familiar not alone with the sanitary features of their respective districts, but equally they should be identified with the commercial, business, and industrial interests." "Sooner or later the national Government will be compelled not only to assume supervision of exterior quarantines, but to provide for a permanent system of co-operation with State and local governments in the administration of inter-State sanitation, in order, on the one hand, to prevent the introduction of exotic epidemic diseases, and, on the other, to prevent their spread from State to State along the great intra-national highways of travel and commerce. This is a national duty. It is one that the national Government only can adequately discharge, and its expense is, equitably, one which should be defrayed from the national treasury."

All this is true, and we sincerely hope that Congress may be induced to take some action in the matter. The National Board of Health should be reorganized, and the marine hospital service should also be reorganized, and the approach of cholera may hasten that desirable result, though we expect little from the present Congress. The new Congress, to convene December of next year, may be able to intelligently handle the matter; but it will probably then be too late, so far as the present cholera outbreak is concerned.

THE AQUEDUCT BIDS REJECTED.

THE New Aqueduct Commissioners of New York City have settled the question of the award of contracts for construction by rejecting all proposals received for the first two sections of tunnel, and ordering a new letting on December 8.

The problem they were unable to solve was this: Fourteen proposals were before them for the first section, ranging from \$802,834 to \$1,476,442, the average being \$1,162,863. (See full report of all bids tabulated on page 537, issue of November 6.) The amount of security they had demanded was \$125,000. If the average of the proposals represented a fair price for the work, the lowest four bidders were so far below that figure that the security required was not sufficient to cover the difference. The lowest bidder of all was frightened when he found how low he was, and did not want the contract awarded to him. But the next above him, who was still nearly \$250,000 below the average, was eager to have the work, and offered to furnish additional security. As against his demand, however, there appeared in his proposal the peculiar fact that his price for brick masonry, comprising nearly one-quarter of the whole cost of the work, was little more than half of what three-fourths of the other bidders considered it to be worth, and was much less than the engineers were sure the actual cost would be. This person, from up the Hudson River, is chairman of a political county committee, and has been a member of the Legislature.

It was rumored that his desire to secure the contract was based on his belief that his political influence and legislative experience would enable him to get legislative relief, in spite of the Commissioners. However that may be, the Commissioners were afraid to let it to him, and found themselves in a dilemma.

If they refused to award him the contract they evidently feared the cry would be raised that they had squandered public money by giving a contract at a higher price than a party offered to do it for and furnish good security, and so the Legislature would be apt to investigate them. On the other hand, if they awarded the contract to him, it would be with almost absolute certainty that the price was too low, and that trouble would ensue. How they expect to do any better at a second letting we do not see. They have yielded to the first attack of the enemy and have thus shaken confidence in their nerve and independence. If they had taken the firm stand that they would not award any contract for a sum less than that which precedents and their expert engineers assured them was the lowest at which the work could be possibly done, and given the work to the most experienced contractor offering good security whose price was nearest to that sum, their position would have been unassailable, and they would have been backed up by the most intelligent public sentiment. But now they have weakened and delayed the beginning of operations.

THE *American Engineer* very properly objects to the not uncommon practice of having public displays of so-called scientific investigations at industrial exhibitions made by persons who are willing to give their services gratuitously. Such work is worth a fair compensation. A man of recognized proficiency in his profession cannot afford to give the time and labor demanded for public exhibitions, and there is great danger of irresponsible parties with a smattering of scientific knowledge entering the field and making experiments in such a manner as not to afford a true criterion of the relative value of methods, machines, or materials used in illustration. The temptation to give the preference to that competitor for public favor who will pay quietly for a favorable exhibition of his wares or processes is likely to be too strong to be resisted by an irresponsible "scientific expert" who can get no remuneration for his services from the public or the managers of the exhibition. A good laborer is always worthy of his hire, and that should be placed at such a figure as to secure honest work.

THE attention of our American plumbing associations is directed to the report of the discussion at the Plumbers' Congress held in London, which we elsewhere print, on the pernicious practice of letting plumbing contracts to builders—in other words, making plumbers sub-contractors. The readers of THE SANITARY ENGINEER know that we have frequently called attention to this demoralizing practice, and in some articles upon some wretched plumbing in and about Cincinnati, published a year ago, we attributed the difficulty largely to the fact that the plumber in that city was in too many instances merely a sub-contractor. Subsequently, in the issue of March 27, 1884, we commended the resolution of the leading plumbers of the city of Rochester, in this State, that they would not be sub-contractors for plumbing-work, and the London *Builder* refers approvingly to the example of the Rochester plumbers.

We suggest this matter of plumbers being sub-contractors as another important question for the present consideration of plumbing organizations in various parts of the country. We have pointed out so often the demoralizing effect that it is not necessary to enlarge upon it here, but we commend a perusal of the arguments advanced at the London congress. Plumbers in the United States will find that the problem in Great Britain is very much the same as it is here.

We are also glad to see that the English plumbers were supported in this movement by the testimony of Mr. Penrose, the present architect of St. Paul's Cathedral.

WE congratulate the architects of the West on their successful first meeting, which has resulted in the formation of a society under the title of "The Western Association of Architects." We give a report of the meeting of this convention, sent us by a special correspondent, and we congratulate the editor of the *Inland Architect* on the auspicious beginning of a movement of which we learn he was an active promoter.

THE appointment of Mr. George W. Birdsall to be the Chief Engineer of the Department of Public Works of New York City, in place of Mr. Isaac Newton, recently deceased, is in the line of civil service reform. Mr. Birdsall entered the service of the department in 1870, at the time Mr. E. H. Tracy became the chief engineer. On Mr. Tracy's death, Mr. John C. Campbell, his first assistant, took his place, and Mr. Birdsall became first assistant. When Mr. Campbell was removed by Commissioner Allan Campbell, in October, 1878, Mr. Birdsall acted as chief engineer until December 6, 1879, when he was duly appointed to that position, which he held until November, 1880, when Mr. Campbell was reinstated by the courts. Since that date Mr. Birdsall has been the first assistant engineer, and has had special charge also of the new Bronx River supply. The completion of that work, and the transfer of the troublesome questions relating to additional water-supply to the New Aqueduct Commission, will give the new chief engineer of the Department of Public Works an excellent opportunity to take effective steps toward reducing the waste of water. His intimate acquaintance with the distribution-system, acquired by his long service as the executive head of the bureau, can now be made useful in carrying out important and much-needed reforms in the management and control of the supply of water to New York. The reduction of the consumption to reasonable limits will be a work requiring as much skill and judgment, and reflecting as much credit on the engineer who accomplishes it, as the construction of works to bring in more water for people to waste.

FREDERICK HINMAN HAMLIN, Deputy Commissioner of Public Works of New York City, died on November 12, from injuries received by being thrown from a carriage. Born in 1848, he graduated in 1868 at the New York University, and entered the engineer corps of the Park Department in 1870. The Bureau of Street Construction, to which he was attached, was transferred to the Department of Public Works in 1872, and he became the engineer in charge in 1877. In 1878, on Mr. H. O. Thompson becoming County Clerk, Commissioner Campbell appointed Mr. Hamlin Deputy Commissioner in his place, and he was retained by Mr. Thompson on his accession to the Commission in 1879.

THE Native Guano Company has made a proposition to the Hendon, England, Local Board to treat the sewage of the town for an annual subsidy of about twenty-three cents per head of population. The proposition was based on the intention of the authorities to provide for the discharge of sewage proper, and the rainfall from roofs and yards, but not from the streets. The secretary of the company said it would produce an effluent to satisfy the requirements of the Rivers Pollution Prevention Act. Such an effluent had been produced at Aylesbury, and the process and manufacture of manure had been carried on without any detriment to the inhabitants, and without causing any nuisance. For years they have received a certificate from the Aylesbury board stating that they were satisfied with the way the company had treated their sewage, and the board increased the subsidy. From the moment the crude sewage came into the works the company would take over all responsibility, and would undertake to remove the whole of the sewage, and cause no nuisance. They had treated the sewage of Leeds for a short time, 2,000,000 gallons a day. They removed an injunction the corporation was threatened with, and turned out too good an effluent for the river it went into. At Hastings a subsidiary company had treated the sewage, but failed from want of capital. At Leamington the company only worked temporarily for Lord Warwick.

OUR BRITISH CORRESPONDENCE.

Close of the Health Exhibition—Royal Commission on Sanitary State of Naples—Water-Famine at Bradford averted—Metropolitan Sewage Question—Deaths of Medical Men at Naples—Chester Sewerage.

LONDON, November 1, 1884.

THE International Health Exhibition closed its doors last Thursday evening at 10 P. M. There was no ceremony and no speech-making, and beyond a good deal of vociferous cheering nothing to mark the closing day from its immediate predecessors. The total number of visitors from the opening day, May 8, to October 31, has been 4,167,683, as compared with 2,703,051, the grand total of the "Fisheries" returns last year. The largest daily attendance was on August Bank Holiday, when 71,854 persons passed through the stiles. It is computed that there will be a net profit in the hands of the Executive Council of something like £40,000, and the question is, What is going to be done with this sum? It would not be a bad plan to utilize a portion of it in augmenting the very slender funds of many of the London hospitals. The awards of the juries have been published in a supplement to the *London Gazette*. There have been 278 gold medals, 572 silver ones, 670 bronze, 187 diplomas of honor, and 110 certificates of thanks awarded, and these exclusive of the prizes offered by the Society of Arts.

A Royal Commission is going to be appointed to inquire into the sanitary state of Naples. Already numerous plans and projects for the sanitation of the town have been presented to the Government by the Prefect and Syndic. It is proposed to spend about £4,000,000 to completely reorganize the system of drainage, and demolish most of the bad quarter of the city. The Naples Water-Works Company has undertaken next year to supply an increased quantity of water to the town, amounting to as much as 700,000 cubic metres a day.

The threatened water-famine at Bradford, alluded to in this column last week, has happily been averted, at least for a time, by a plentiful fall of rain. The population of Bradford is over 350,000, and for this vast number at the end of last week the total storage of water in the corporation's twelve reservoirs, having a capacity of 1,584,339,000 gallons, was only 50,000,000 gallons, as against 1,057,000,000 at the corresponding date last year. The rain of Sunday and Monday was the means of increasing this supply by nearly 30,000,000 gallons, and the increase has been since steadily maintained. It is considered that all danger of serious scarcity is now at an end. Manchester's water-supply was also, at the end of the week just passed, giving the Water Committee grave cause for anxiety, but affairs had not got into such a bad condition as at Bradford, and the recent rains have removed all fear of scarcity.

Several proposals for the purification and utilization of the sewage of the metropolis were rejected by the Metropolitan Board of Works at its meeting yesterday, on the ground that the proposals made amounted to little more than experiments, the expense of carrying out which would be far more than it was advisable to incur. The board intimated its willingness to take advantage of any really good plan whereby the river could be purified and the sewage utilized, but as the volume of sewage to be dealt with was very large, it could not consider piecemeal resources.

According to the *Lancet*, twenty medical practitioners have died in Naples, out of 139 engaged in attending cholera patients, under the White Cross Society, during the recent epidemic.

Chester, England, is supplied with water from the River Dee, by a company which has two pumping-stations near each other, a mile and a half above the city. A 24-inch pipe conveys the water from the river across the meadows to a receiving-well, whence it is pumped by two horizontal compound condensing engines, with steam-cylinders of 14 and 26 inches diameter, and 36-inch stroke, operating-pumps of 16½ inches diameter. The boilers supply steam at 120 pounds pressure, and are fitted with McDougall's mechanical stokers, which are so arranged that all smoke is consumed in the furnaces. The water is lifted 75 feet to a subsiding reservoir, and then flows over filter-beds containing 8 feet of sand and gravel. There are 7 filters of a combined area of 50,652 square feet, and after passing them the water is collected in a tank, whence it is pumped into a wrought-iron tank holding 268,000 gallons on a brick tower

72 feet high. The pumps are of 26-inch diameter and 60-inch stroke, operated by a pair of differential engines, with steam-cylinders of 18 and 36 inches diameter and 60 inches stroke. The steam pressure is 60 pounds. The daily supply is about two million United States gallons, and there are thirty-five miles of mains. SAFETY-VALVE.

ENGLISH PLUMBING PRACTICE.

BY A JOURNEYMAN PLUMBER.

No. XXVI.

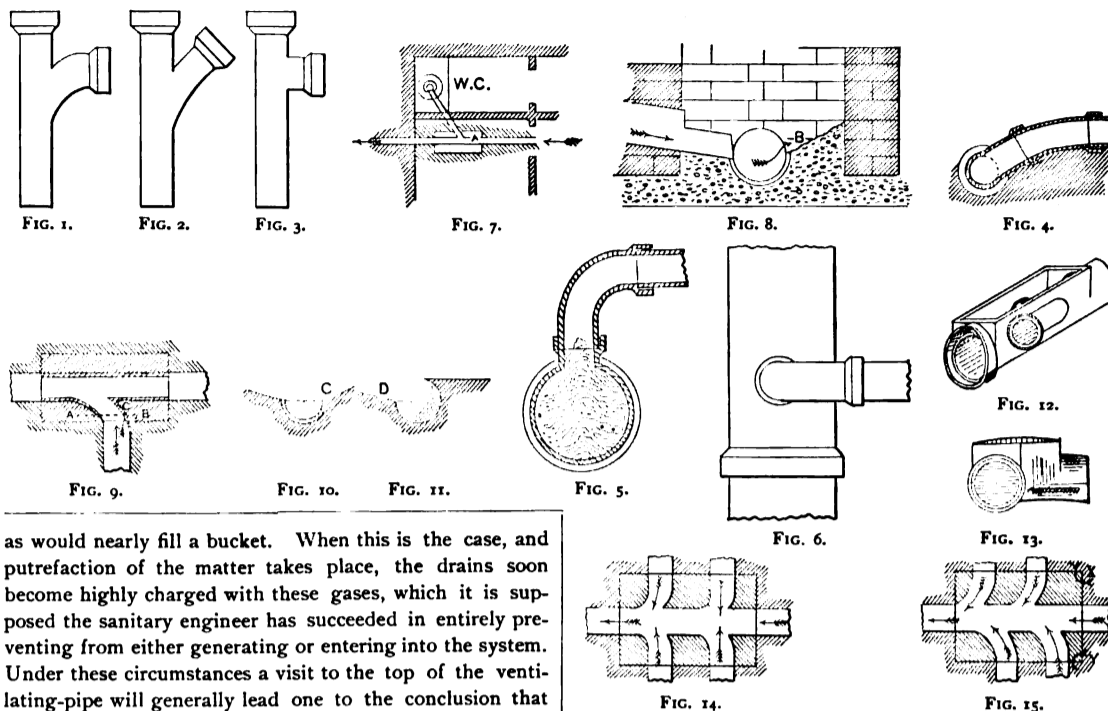
(Continued from page 486.)

DRAINS AND TRAPS (CONTINUED).

WHEN it is necessary to have one drain branched into another it is of more importance than a great many people think to have a Y-junction pipe, as in Figs. 1 and 2, instead of using a square or right-angled one, as in Fig. 3. The reasons were fully given in an earlier paper, when illustrating soil-pipe branches. In the case of drains with horizontal square branches it often occurs that when sewage is discharged down a branch as much flows back up the main drain as in the direction of the current, with the result that the liquid portion afterward dribbles away, leaving a solid or semi-solid matter behind. This will lie in the bottom of the pipes until a flush from a higher level of the main drain removes it.

Where a drain lies flat, or has only slight fall, any sewage flowing down very frequently eddies, and runs a short distance up any branches, especially when they and the mains are of the same size. It would entail a certain amount of trouble to have branches especially made so as to offer resistance to this, but the evil can be avoided by raising the branch a little, as shown in section, Fig. 4. Where a small pipe discharges into a large one this evil will not happen, unless the main drain is running so full that sewage reaches up to the branches. The writer some three or four years ago had an experience of some of the above evils very fully illustrated at one of the Government offices not far from the Strand, in London. A branch-drain was continually stopping up, and having to be forced so frequently, it was decided to open it until the cause of the stoppage was found. This proved to be at its junction with the main drain. Figures 5 and 6 are section and plan illustrating the cause of it all. The main drain was twelve inches and the branch four inches in diameter. The 4-inch drain was from a soil-pipe, with four water-closets upon it. In the bottom of the 12-inch pipe was a pyramid formed of wet paper, and every time a water-closet was used the wet paper falling vertically on the bottom of the pipe, as shown, gradually accumulated until it eventually choked the end of the 4-inch pipe. If any reader were to take a handful of wet paper and let it fall from a height, and then two or three more, one after the other, on the top, and then try to push it over, he would be surprised to find the resistance it would offer. In the above case there was very rarely any water passed down from the upper portion—in fact, only when rain was falling.

Most of the best sanitary engineers in London have inspection-chambers built at all junctions of drains, and also at any change of direction—i. e., at every turning—and have only a half-pipe or half-bend at that point, so that if any obstruction should lodge there it can easily be removed; or if it should be in the straight lengths, any ordinary drain-machine (which is similar to a chimney-sweep's) can be pushed through, and so clear it away. A great many people dub themselves "sanitary engineers," and by dint of copying others sometimes make a fairly good job, but for want of experience very often make serious mistakes. The writer was passing down a street near Victoria Station a few weeks ago, and noticing that the drains were being put in order (?), had the curiosity to look over the railings, and there saw one of the above manholes completed and the drains being used. Figure 7 is a sketch plan showing how it was arranged. The branch-drain from the water-closet was joined to the channel-pipe in such a way that the sewage was discharged up the main drain, and then had to flow back again to pass into the sewer. At A were several lumps of excreta, which no doubt would lie there until a current passed by from the upper part of the drain to wash them away. Another and very common mistake of some of these so-called sanitary engineers is to bring a junction in at right angles, and also to have the bottom channel too shallow, so that anything coming down the branch washes up, and lies on the ledge formed for a man to stand upon when examining or clearing a drain. Figure 8 is a section showing this, and as at B the writer has sometimes seen as much semi-solid sewage



as would nearly fill a bucket. When this is the case, and putrefaction of the matter takes place, the drains soon become highly charged with these gases, which it is supposed the sanitary engineer has succeeded in entirely preventing from either generating or entering into the system. Under these circumstances a visit to the top of the ventilating-pipe will generally lead one to the conclusion that the drains are not as they should be. It is scarcely necessary to repeat that it is not the drains themselves that give off foul gases, but only what they retain, and if by proper construction and flushing nothing is allowed to remain in them, it is difficult to imagine where the smells can come from, especially when the drains are so ventilated that a current of fresh air can freely pass through from end to end. Even in some cases where these manholes have been fairly well arranged, want of thought, and in some cases an ignorance of hydraulics, has led to another error, which is shown in Fig. 9, Fig. 10 being a section on A B. It must not be supposed that because the branch channel is curved that the water will follow it. As a matter of fact, it will wash up, and sometimes leave a deposit at C. To overcome this difficulty it is necessary to curve this bent channel as shown in section at Fig. 11. The dotted lines show the surface of the water as it passes around the bent portion. It is not necessary to raise the side D so high as the other, but if it is not done the manhole does not present a smart appearance when finished.

The writer has been through the so-called International Health Exhibition, and although he has looked everywhere, he cannot see that any one has invented a channel-pipe with junctions suitable for fixing in these manholes. The best he has seen consists simply of ordinary half-pipes and half-bends, made to suit almost any position; but the fact remains that when they are fixed the spaces between the branches have to be made good, brick-work built on each side, and faced up with cement to get the required depth, so that the sewage is kept in the channel, and not allowed to splash about anywhere. There is no reason why a proper channel-pipe, with junctions, should not be made all in one piece, as in sketch Fig. 12, or bends, as in Fig. 13, which could be fixed quite easily, and thus avoid the patchy appearances these places generally present, as now done. Before leaving the question of manhole-junctions it would be as well to point out another important point, and that is not to allow two branches on opposite sides to be directly facing each other, in which case water or sewage coming down one pipe with any velocity would rush up the one opposite. Figure 14 shows this evil, and Fig. 15 the precautions to be taken, so as to avoid it. Ordinary manholes are built with common bricks, and where of considerable depth strong wrought-iron loops are built in the angles, as shown at X Y, Fig. 15, so that a man can get down without the aid of a ladder, which would occupy space, and leave little room for him to work in. Sometimes these manholes have a coating of lime-wash, which makes them look clean and smart. Some sanitarians will have them rendered in cement and sand, worked up to a face.

Where expense is not an object, it is a good plan to build manholes, and use white-glazed bricks for the face-bricks, as they always look clean and are impervious to moisture, and if they should become dirty, a man with a pail of water and a broom will soon wash them as clean as when first new.

Drain disconnecting-traps and manholes over them will be considered in the next paper.

(TO BE CONTINUED.)

WESTERN ASSOCIATION OF ARCHITECTS.

(From Our Special Correspondent.)

CHICAGO, November 14, 1884.

PURSUANT to a quite general agitation of the subject in the public press, especially the *Inland Architect*, a meeting for the purpose of organizing a Western Association of Architects began in Chicago, Ill., November 12, and the sessions reached into the third day. At the opening session the attendance was large, and representatives of some twelve States were present, and later other gentlemen arrived. The place of meeting was the hall at No. 15 Washington Street, provided through the courtesy of Mr. Henry Lord. The call to order was made by Mr. McLean, of the *Inland Architect*, who nominated Architect D. H. Burnham, of Chicago, for temporary chairman. Mr. Burnham was elected, and Mr. Henry Ives Cobb, of Chicago, was made temporary secretary.

On motion of Mr. E. O. Falls, of Toledo, O., the proprietors of the *Inland Architect* were admitted without votes to the deliberations of the body.

A committee on credentials, consisting of Architects Hudson, of St. Paul, Minn., Ramsay, of St. Louis, Mo., Taylor, of Des Moines, Iowa, and Flanders and Gay, of Chicago, was named by the chair, and the session closed.

On reassembling at 3 o'clock, Chairman Burnham addressed the convention on the objects to be sought by association, in part as follows:

"It has been suggested that the purposes for which this convention is called be mentioned in a general way, and that this duty devolves upon the chair. I feel a little diffidence in attempting to address you, gentlemen, and all the more because my notification is extremely short.

"We look to this convention to inaugurate an era of good feeling among the architects of the West. Recognizing our standing in the advance of civilization, we feel that combined effort would save to us and to posterity the best thoughts of us all; that working merely as individuals, entertaining a narrow, jealous disposition toward others, we cut ourselves off from those corrections which are absolutely essential to prevent such glaring flaws as inevitably come from haste.

"To-day we have a vast conglomeration of men who make up our great West. More than the Athenians, the Carthaginians, or the Romans, do we feel the spirit of enterprise. In a greater degree do we draw to our centres the thinkers of all countries. Our commanding, determined, bold spirits, filled with ambitious dreams, have left their old homes in Germany, France, Italy, England, and the Orient, and in the older States of our country, imbued with the same restless activity, the same readiness to give up the old when the new is better, the same fearless examination of everything laid before them. We are without doubt, in a certain sense, adventurers. Each man brings some knowledge peculiar to the land of his birth. Each one has the disposition to look upon things in accordance with the nature of his blood and the education of his province, and the community as a whole is thus constantly enriched with the thought of this steady stream of keen, incisive, thoroughly living men. If we recognize

this fact, and all of us determine to make the most of it, we must show a progress that will surpass anything which has gone before. Indeed, we possess the whole past in a living form, ready to actively assist each and all of us in the struggle to eliminate crudities and to secure what is in accordance with the unchanging laws. No man among us can possibly possess more than a fragment of the knowledge of all, and if we would do the best with our lives we must do the best for the community and the times we live in. This can be brought about by each one acknowledging his shortcomings and being willing to frankly and kindly accept the help of others, and still more, to give it in the same spirit himself. If there is a man among us who has an ambition to leave an honorable name—and I hope this is true of every individual—he may be sure he will fail of his object if he works for himself alone.

"There are many things which will undoubtedly come up for discussion in the convention which are peculiarly its province. I will therefore only mention a few, as, for instance, a schedule of fees, a code of professional ethics, and that frequent source of trouble—competitions. Remember that our science is a union of all sciences, and this to a degree that cannot be said of any other profession, and that a great man is both a theorist and at the same time thoroughly practical; that we ought to be ingenuous and apt to learn. Recognizing this, it is hoped that an impetus will be given here which will carry us on to success and make our work better. It is not to be hoped, perhaps, that the name of each shall go down to posterity, but it may be hoped that the united efforts of us all will leave impressions which shall stamp a pure American spirit on the ages to follow. Shall we teach the lesson of united effort in an honest and manly cause? The famous scientist whose philosophy crowns the thought of this century, said in his few words of warning to Americans, 'The duration of your institutions will depend not on your avocation, but upon your character.' Does not every one of us see that it is so, and hope with Spencer that the blood of our hearts may warm us toward the common good, and the thoughts of our brains be toward the accomplishment of our work as a whole, and not primarily toward the fleeting success of the individual, be it in finances or in popularity?"

The Committee on Credentials then reported the names of architects entitled to participate in the proceedings.

It was formally voted that a body, or association, should be constituted to consist of the architects whose names had just been read, and of others whose names should from time to time be passed upon by the Credential Committee, which had just reported.

The election of permanent chairman and secretary of the convention then occupied considerable time. Mr. Hudson, of St. Paul, nominated Mr. Burnham, who modestly asked to be excused. Mr. Root nominated Mr. E. T. Mix, of Milwaukee, but he was not present at this session. The chair resigned his seat temporarily to Mr. S. H. Treat, of Treat & Foltz.

A committee on nominating officers was named—Messrs. S. M. Randolph, of Chicago; H. W. Kirchner, of St. Louis; Hudson, of St. Paul; Buffington and L. D. Cleveland, of Chicago—and nominated Mr. Burnham, who again expressing unwillingness, resigned the chair to Secretary Cobb. Mr. Clay, of Wheelock & Clay, Chicago, nominated Mr. Mix, of Milwaukee; Mr. J. J. Egan, of Chicago, nominated Mr. E. Burling, of Burling & Whitehouse, Chicago; Mr. C. P. Thomas, of Chicago, nominated Mr. W. L. B. Jenney, of Chicago; the latter nominated Mr. H. W. Kirchner, of St. Louis. Several Chicagoans thought a non-resident of Chicago should be chosen, an idea that Mr. Hudson, of St. Paul, combated, saying: "I think I can speak for the outsiders that we have no feeling in regard to Chicago except the very best, the very highest character, and would just as lief, if not rather, see a Chicago gentlemen preside over this meeting than any other. We are your guests, and of course, expect to treat you very nicely, as you are treating us. Mr. Burnham has presided in a very dignified way, and let no one waste sympathy on the outsiders. The position is not permanent, for the ensuing year, simply for this convention." All the other nominees declined, and Mr. Burnham was chosen by acclamation permanent chairman of the convention. "I feel," said he, after again returning thanks, "that this first meeting of the architects of the North-west will result in far more than any of us can foresee." Mr. Taylor, of Des Moines, Iowa, was chosen permanent secretary.

A committee was named on constitution and by-laws, the following gentlemen being selected by the chair: C. A. Ramsey, of St. Louis; John P. Root, of Chicago; W. L. B.

Jenney, of Chicago; Hudson, of St. Paul; Henry Ives Cobb, of Chicago; George Wirth, of St. Paul.

The convention met at 10.30 Thursday morning, Chairman Burnham presiding. The Committee on Constitution and By-laws reported through Chairman Ramsey. The main provisions, as adopted, are as follows: "The name of this body shall be the Western Association of Architects. The objects of the association are to unite in fellowship the architects of the United States; to combine their efforts so as to promote the artistic, scientific, and practical, efficiency of the profession, and to cultivate and encourage the study of kindred arts. The association shall consist of fellows and honorary members. Any architect practicing his profession in the United States may become a fellow of this association. All members in good standing in any State association, organized under the laws of that State, also all members of the American Institute of Architects, who shall become subject to the constitution of the Western Association, are by virtue of such membership fellows of this association." The usual officers and their duties are prescribed. The by-laws provide that the annual meeting shall be held the third Wednesday of November, the place being fixed at each preceding meeting. "Roberts' Rules of Order" was substituted for Cushing's Manual as the director of business. An initiation fee of \$5 was fixed, the fee being remitted to all members of State associations and the American Institute of Architects; the annual dues are \$2. All applications for membership are passed upon by the Board of Directors, five members.

The *Inland Architect*, of Chicago, was adopted as the official organ of the association, its editor elected an honorary member, and its office made headquarters pro tem. It was resolved that all members who may become such before or at the annual meeting of 1885 shall be declared charter members, and from them no initiation fee shall be required. A quorum was defined to mean twenty-five fellows. A committee—Messrs. Root and Cochrane, of Chicago; Lee, of Des Moines; Fallis, of Toledo, and Ramsey, of St. Louis—was constituted to submit a report, at the next session, on the subject of professional practice in the matter of fees and competition.

Adjourned until 11 o'clock Friday.

The convention reassembled at 11 A. M. Friday. Chairman Root, of the Committee on Fees and Competition, read the following report, which, after a long discussion, was adopted:

First.—That in his relation to clients and contractors, the architect should be an impartial arbitrator, and that under no circumstances should he act as a special pleader for either party.

Second.—That the relation between architects and clients should be confidential, and that no architect is worthy of employment who is unworthy of trust.

Third.—That it is the sense of this association that the architect should, in all cases, superintend the work designed by him.

Fourth.—That in cases where, for special reason, the architect does not superintend the work designed by him, his responsibility ceases with the delivery and acceptance of the plans, unless by expert testimony it can be proved that the plans were defective.

Fifth.—That the President, Secretary, and Treasurer of this association constitute a Board of Directors, whose duty it shall be to adjust all questions in dispute between members of this association and their clients, which shall be submitted to this board.

AS TO FEES.—Recognizing the desirability of uniformity throughout the country in the matter of fees, and having implicit confidence in the action of the American Institute of Architects in this respect,

Resolved, That this association adopt the schedule of fees recently adopted by the American Institute of Architects, and that the secretary of this association mail to each member a printed copy of this schedule as soon as practicable.

COMPETITIONS.—*Resolved*, That no architect should enter a competition for any building or other work unless the decision of the competition shall be made by recognized experts.

During the discussion above referred to Mr. Root said the committee's idea was that the resolutions, while not absolutely obligatory, would be a guide to practice. Chairman Burnham, calling Mr. Adler to the chair, pointed out the heart-burnings and evils that had resulted from competitions, and the need of corrective measures. Messrs. Cochrane, Lee, Hodgson, Ramsey, Adler, Douglass, Illsley, and others, emphasized the need of action, by instances of glaring evils. One gentleman declared, regarding superintending work, that he couldn't tell the difference between himself, the builder the family physician, and the minister.

The Chair—We would like to have the gentleman draw the line, yet by prudent stipulations in contracts the confessed confusion may be abated.

Mr. Ramsey—Just send in your bill and then stop.

Mr. Clay thought, regarding competitions, that the evil was often in the architects, and not in their plans or clients, through a greed to grasp and appropriate the ideas of others. If every architect would refuse, when making a working drawing, to incorporate any idea of another, he would very soon stop this sort of thing.

The Chair—He who has competitive plans laid before him may, under no circumstances, put in a competitive plan himself. I don't think any honorable man can possibly hesitate to throw aside any chance that is offered him, where he is asked to do so thoroughly unjust a thing as that. No doubt that is the sense of the meeting.

Several gentlemen proposed amendments to the resolution on competition, the amendments tending to greater restrictions and regulations of the practice. Other gentlemen opposed these, one objector of commanding prominence saying that if they passed he must resign from the association. The association was in its infancy and should act slowly on so weighty a subject, and only after full deliberation.

Mr. Sullivan, in view of the evident feeling that had been stirred, and in the interest of harmony "while the wall was so green," moved to table the amendments.

Mr. Clay seconded the motion.

This was done, and the committee's report, as a whole, adopted.

Then on motion of Mr. Illsley the chair appointed a committee of five, himself as president, to "draft a by-law on the subject of competition, and submit a copy to each member for comment, and thereupon prepare a paper for action at the next meeting of the convention."

This committee consists of Chairman D. H. Burnham, and Messrs. William Holabird, Chicago; George Wirth, St. Paul; John W. Root, Chicago, and C. E. Illsley, of St. Louis.

A communication from an eminent Cincinnati journalist hoped the Western Association of Architects "would be broader in spirit than the Eastern," and gave a savage thrust at "the Mullet régime."

A resolution by Mr. Lee, providing for a committee of one fellow in each State in the interest of unifying, and if possible, simplifying, the building laws of the different States, was passed. The committee is as follows:

D. Adler, Illinois; J. Hodgson, Minn.; W. S. Matthews, Tenn.; E. O. Fallis, O.; C. A. Ramsey, Mo.; C. H. Lee, Iowa; James F. Alexander, Ind.; J. S. Matthews, Wyo.; S. J. Osgood, Mich.; Albert E. Cobbe, Dak.; C. A. Curtin, Ky.; E. Townsend Mix, Wis.; C. C. Kemble, Pa.; Sidney Smith, Neb.

Adjourned for half an hour.

On the assembling of the closing session the convention heard Committeeman Flanders on the subject of the location of the next convention. The committee named, without expressing a preference, both Chicago and St. Louis, and the latter was selected unanimously. Before proceeding to a ballot, Mr. Root, of Chicago, said the general sentiment in Chicago was that the president should come from outside of Chicago, since the Board of Directors perhaps should be selected from that city, as they would have intimate relations with the secretary, whose office had been located at Chicago. Messrs. Cochrane, Clay, and Lee were named tellers, and an informal ballot for president, secretary, and treasurer was taken. On the third ballot Mr. C. E. Illsley, of St. Louis, was elected president.

President Illsley made a very happy speech, saying that he would consider himself a sort of connecting-link between Chicago and St. Louis. "I think the time not distant, if indeed it has not already arrived, when the great glory of this lake will be not in its size, but because Chicago is on it. Now we hope the time will come when it will be said of the Mississippi not merely that it is the longest river on the globe, or the greatest river, if you please, as the chief things to be said about it, but that it is the river on which St. Louis stands. One of the principal things that make a city, after all, is the quality of the buildings which its architects put up. That is the thing above all others that draws me up to Chicago every time I can get there. Now, when you come down to St. Louis, we expect to get the benefit of a good deal of the inspiration that we have received from you here, and that will give us a great help in our work of making St. Louis the great city we expect it

to be. Now, I have no speech ready to make. I thank you in the name of St. Louis for this honor."

On the second formal ballot, Henry Lord Gay, of Chicago, was elected secretary.

For treasurer several ballots were taken. On the third ballot Mr. D. Adler, of Chicago, was chosen.

A committee to nominate—really elect—a board of directors was appointed, and cast the ballot of the convention for D. H. Burnham, Chicago, Chairman; S. H. Treat, Chicago; Louis Sullivan, Chicago; Sidney Smith, Omaha, and W. L. Plack, Des Moines.

A handsomely-mounted address was received, which said: "We, who are sent here to represent the Master Plumbers' Association of the United States, solicit your co-operation and aid in advancing sanitary science, good plumbing, and efficient drainage, in the hope and belief that we, too, may become renowned, not for the grand and lofty structures we may design and rear, but renowned and honored as the safeguards against bad water, bad air, and bad health. We ought to work hand in hand in this cause, and we hope we will not be regarded as presumptuous if we suggest to you that, in awarding the execution of your plans for plumbing, in building, if you will determine to encourage men in our craft who are known to be competent and honest, you will have taken a long step toward the inauguration of this hygienic millenium. Efficient plumbers are ready and willing to labor in co-operation with architects and builders, with a view to approximating perfection in plumbing and drainage. This is one of the chief objects for which our association was formed; and, if we do say it, it is a laudable one. It has in view the improvement of the public health, the curtailment of the death-rate, and the benefit of mankind." The address, which bore the signatures of Alexander W. Murray, J. J. Wade, and Frank E. Ruh, Committee, was received, and will be printed in the proceedings.

Resolutions of thanks were passed to the chair and the secretary, and for the uniform courtesy and kindness of the Chicago hosts, including Mr. Henry Lord Gay, whose Permanent Exchange of Building Material and Improvements was indorsed. The recipients of these compliments responded briefly, and at 5:30 o'clock the Western Association of Architects adjourned, to meet in St. Louis, the third Wednesday of November, 1885.

Thursday evening the Chicago architects entertained their guests at a handsomely designed and successfully conducted banquet at the Grand Pacific Hotel, there being 150 covers. Chairman Burnham presided, introducing the speech-making in a most happy manner, and introducing the toasts with appropriate remarks. The first toast was "The Western Association of Architects," responded to by Mr. J. C. Cochrane, who, in the course of his remarks, said:

"I feel very proud to welcome this body of architects and representative men, for of all professions I regard architects as representative men. I feel proud, too, to recognize such a handsome body of men. [Voice, 'Now you've got us.'] My sentiment is a grand one. Having been in the West so long I have felt very much the want of such an association, the want of its support and advice, and this I hope is the commencement of an association that will last forever, and that it will be of great aid to us and our successors in our profession in every way. It should teach us not only our professional duties, but our duties as men, honest men, for if any man should be honest it is the architect, trusted entirely, as he so often is, with the preparation and execution of plans for the erection of a home. As to what should make an architect eligible for membership in this association, in the first place he should be a scholar versed in mathematics, he should be an artist, a skilled business man, a lawyer in one sense, as he knows better than most lawyers just the points to be brought out in a contract. And he should be a gentleman—membership in this association should be an *entrée* into society. Our annual meetings should tend to instruction, through papers or lectures. Schools lasting a month each year might benefit especially the young, and young men passing satisfactory examinations before appointed committees should receive a certificate to practice. An associational library would follow, and an art gallery of size and excellence would result if each architect here would contribute one picture. Our friend who has established a permanent exhibit here has set a good example. Regarding fees and competitions, matters of such delicacy require much deliberation and tact in treatment, but whatever fee or percentage is once established must be lived up to by every member of the associa-

tion, or else out he goes. Cutting rates, let younger men know, is wormwood in the end.

"We have had in Chicago a chapter of the American Institute of Architects, and have tried to carry it along, but it has been a perfect failure, and in my view a detriment to the architectural profession, for the reason that it was scarcely at all attended. I attribute this collapse to the fact that the American Institute of Architects really seems to be an Eastern institution. I feel that we have not been treated fairly in the West—have not been represented in the West. I don't blame the American Institute of Architects, for it has been the head centre of architecture in this country. In our organization let us old fellows stand aside, and let us elect to the offices young men, ambitious men, men who can give time to the work; especially the secretary should be a live man, and devoted to his duties. In reference to the location of officers the convention will have to decide; I have heard several opinions on that subject. And now I want to remark, in reference to our friend, the *Inland Architect*, that it has brought about this convention, as I think, more than any one other influence, and in its honor I propose three cheers."

They were given heartily, and in response Mr. McLean, of that deserving Chicago publication, made an address that was well received, tracing the advance of Western architecture.

To the toast, "The American Institute of Architects," Mr. W. L. B. Jenney, fellow of the Institute, responded as follows:

"GENTLEMEN: Please allow me thank you in the name of the Institute for your kind remembrance, and to extend to you her motherly love. Some thirty-six years the Institute commenced its existence as an incorporated body, under auspices not as favorable as those that here obtain. The Institute was alone in her struggle for existence; we have to guide us her thirty-six years of experience, and her assistance, besides that of numerous State and other local organizations. The Institute has endeavored to unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific, and practical efficiency of the profession. What the Institute proposed to do for the continent we propose to do for the West. The Institute two years ago had a membership consisting of some sixty-two honorary members, among them such well-known names as Sir Charles Barry, William Burgess, C. R. Cockerell, James Fergusson, George Goodwin, Sir George Gilbert Scott, Violet le Duc, and others; sixty-four corresponding members, men interested in architecture but not practicing architects; and 362 fellows and associates, architects in good standing, located in all parts of the country. Numerous additions have recently been made, of which I have no record.

"The annual meeting of the Institute is usually held in the East, because the attending members are largely from that locality. Each year endeavors have been made to interest the Western members, and to induce their attendance at the next annual meeting, but with little success. To further this end, two years ago the meeting was held in Cincinnati, but there was only one member present from west of that city. A year ago the meeting was held in Newport and Providence at the fashionable season. There was but one attendant from Chicago, and none from beyond, westward. A few days ago the meeting was held in Albany, at which there was no attendance from the West beyond Cincinnati and Cleveland. These meetings are all exceedingly profitable and interesting. The visiting architects are the guests of the local chapters, who entertain royally, assisted by many liberal-minded and wealthy gentlemen, who open their houses, show many beautiful interiors and works of art, and spread out a lunch-table, with big bowls of capital punch and plenty of champagne and good cigars. In spite of all these pleasures and profits the attendance is not large. This year at Albany the visiting architects numbered but twenty-two. One sees year after year nearly the same faces. Why this small attendance, and why confined to the same persons, with but little variation? The immense extent of our country and the difficulty of being absent from one's office for a number of days just at the time the meetings are held, is one, but this is not the main reason. It is because those members who are not in the habit of attending feel that they are not acquainted, and that they would not feel at home. This is a great mistake. Every person who has once attended a meeting of the Institute will do all in his power to attend every one thereafter. At a single visit he feels that he is received with such good fellowship that he counts every member his friend. This good fellowship among members

is one of the greatest advantages to be derived from these associations, and it is with great pleasure and with encouraging hopes of a brilliant future, that we see so many present at our first meeting, and our first duty is to make friends with each other. The Institute has acquired an honorable name throughout the world, and it is to-day an honor to be enrolled among her fellows. I hope that our board of directors will sooner or later arrange with the trustees of the Institute some method by which all members of this association will become *ipso facto* members of the Institute, conferring as many benefits as they obtain. There is strength in numbers, and it is a good reputation to be known to frequent good company. This association, united with the Institute, will include nearly every architect of good standing in the land, and some of the most celebrated of Europe. We cannot be ignored. We will establish the profession on as high a pinnacle as that of the law of medicine and science—for its members the same high respectability that is so freely accorded them in Europe.

"Fellows of the Association of Western Architects, the Institute extends to you all the right hand of fellowship, and wishes you a success more brilliant than the most enthusiastic among you even dares to hope."

"The British Institute" was toasted, and Mr. Sidney Smith responded. He spoke of it as an institution known and celebrated throughout the world, enrolling masters whose works would remain permanent models, and he, as simply an humble fellow of the Institute, felt himself unduly honored. All must concur with him that the Institute needed but little praise; its work was its benediction. He hoped and believed that this newly-formed association would grow up and be what that is, though the British Institute of to-day numbers some 2,200 men of all ages. "I remember seventeen years ago when I made application for membership in that Institute how I trembled in my boots on confronting the venerable, gray-headed men, the examiners, and how I expected the very first question they asked me I could not answer, but I managed to struggle through the best way I could. So severe an examination, or such class of examination, is out of date here. I think the intelligence, the energy, and enlightenment of this body of men, and of our young draughtsmen in the United States, can dispense with it. Practical knowledge is now rightly made much of, as well as theoretical, and our schools to-day are making prominent what is most essential, realizing that the best practically furnished draughtsmen are the most demanded. Perhaps some provision is in order for teaching draughting still more exclusively as a specialty. As architecture commenced in the East, and spread from Greece to Rome, so is it spreading from our Eastern seaboard to this vast West, and here we expect to see the greatest development of any in the United States. To that end our new association will be a prime factor, and the noble traditions of the British Institute will lend an inspiration."

Mr. D. Adler responded to "The Office," and in the course of a series of practical remarks showed the benefits of the association in making architects acquainted with each other. "Let us hope that when the next convention calls us together, it will not be the remark of almost everyone of us that we know but very few of those assembled."

Mr. Francis M. Whitehouse made a witty and graceful response to the toast, "The Architect and Society."

Mr. John M. Root was very funny in his word-paintings of the "Feminine Client," the speech being punctuated at almost every sentence with laughter.

Mr. Ramsey, of St. Louis, described "The Store" with elucidation of much valuable information, especially applauded in the concluding sentence, that St. Louis desired to entertain the next annual convention.

Mr. Paul Latrup made rollicsome and mirth-provoking answer for "The Draughtsman," and the conclusion came with Mr. Lee's remarks on "Fees and Clients," of which it was evident, he said, from the handsome hospitalities of the evening and the two preceding days, that the Chicago fellows enjoyed a rich endowment.

The following persons attended the convention: A. A. Druiding, St. Louis, Mo.; E. O. Fallis, Toledo, O.; W. S. Matthews, Nashville, Tenn.; Eugene H. Taylor, W. L. Plack, and C. H. Lee, Des Moines, Iowa; James E. Alexander, Lafayette, Ind.; W. A. Fulkerson, Cedar Rapids, Iowa; J. B. Legg, St. Louis, Mo.; J. S. Matthews, Cheyenne, Wyoming Territory; J. Hodgson, Minneapolis, Minn.; George Wirth, St. Paul, Minn.; F. D. Hyde, Dubuque, Iowa; W. G. Robinson, Grand Rapids, Mich.; Sydney J. Osgood, Grand Rapids, Mich.;

Paul S. Lietz, Peoria, Ill.; James Oliver Hogg, Hannibal, Mo.; C. A. Dunham, Burlington, Iowa; Charles K. Ramsey, St. Louis, Mo.; G. G. Bullard, Springfield, Ill.; Albert E. Colby, Yankton, Dak.; C. H. Owsley, Youngstown, O.; H. C. Lindsay, Zanesville, O.; C. A. Curtin, Louisville, Ky.; George W. Rapp, Cincinnati, O.; H. W. Kirchner, St. Louis, Mo.; J. McDonnell, Green Bay, Wis.; L. Kledus, St. Louis, Mo.; E. S. Hammatt, Davenport, Iowa; F. S. Allen, Streator, Ill.; E. Townsend Mix, Milwaukee, Wis.; C. E. Illsley, St. Louis, Mo.; William H. Parker, Cold Water, Mich.; James K. Taylor, St. Paul, Minn.; F. M. Ellis, Marshalltown, Iowa; W. E. Elliott, Elgin, Ill.; J. J. Chandler, Racine, Wis.; L. S. Buffington, Minneapolis, Minn.; C. C. Kemble, Pittsburg; R. F. Thompson, Youngstown, O.; William Davellarr, Milwaukee; T. U. Philpot, Milwaukee; William Necir, Kansas City, Mo.; Sidney Smith, Omaha, Neb.; E. V. Koch, Charles I. Williams, Dayton, O.; F. G. Clausen, Davenport; Prof. N. Clifford Ricker, Champagne, Ill.

From Chicago the architects present were—John W. Root, Henry Ives Cobb, L. D. Cleaveland, Jean A. Weirzbieniec, S. M. Randolph, James H. Moore, Francis M. Whitehouse, fellow A. I. A.; Normand S. Patton, William Longhurst, A. Cudell, W. W. Clay, O. L. Wheelock, Paul C. Loutrop, D. H. Burnham, F. R. Schock, O. L. Pierce, A. M. F. Colton, J. J. Egan, L. G. Hallberg, William Holabird, J. W. Ackerman, C. O. Hansen, Julius H. Huber, Henry F. Starbuck, Otto H. Matz, Samuel A. Treat, George M. Moulton, Franklin B. Burnham, S. V. Shipman, C. M. Palmer, W. L. B. Jenney, John N. Tilton, Gregory Vigeant, P. W. Ruehl, J. J. Flanders, J. L. Silsbee, C. C. Miller, Alfred Smith, Henry Lord Gay, George S. Spohr, Oscar Cobb, C. S. Frost, Theodore Karl, William Strippelman, C. P. Thomas, E. A. Burling, L. B. Dixon, R. E. Schroeder, John Lewis, Louis H. Sullivan, D. Adler, Fritz Foltz, F. L. Charnley, Henry W. Hill, C. L. Stiles, L. G. Quackenboss, Louis J. Schaub, Robert C. Berlin, M. L. Beers, John C. Cochrane, H. D. Dean.

COMPARISON OF DIFFERENT PAVEMENTS.

M. LAVALARD, Engineer of the Paris Tramway and Omnibus Company, has made a series of experiments on the force of traction required on the various sorts of pavement in use in Paris. The results of the experiments were as follows, the figures indicating the mean force necessary to draw a (metric) ton:

				Kilograms.
Wooden pavement,	Rue de Rivoli,	Dry,	At a trot,	15.196
" "	Champs-Élysées,	"	At a walk,	16.620
" "	" "	"	"	19.570
" "	" "	"	At a trot,	17.720
" "	" "	"	"	17.560
Stone "	Boulevards,	Dry,	"	14.360
" "	" "	"	"	17.200
Macadam	" "	Dry,	"	17.200
" "	" "	"	"	12.040
Macadam	" "	Wet,	"	16.770
" "	" "	"	"	18.890
" "	" "	"	"	17.910

The *Semaine des Constructeurs*, from which these facts are taken, calculates the mean results of the experiments as follows:

	kilograms.
Wooden pavement, rue de Rivoli	15.2
" " Champs-Élysées	17.8
Stone " Boulevard	16.0
Dry Macadam, Boulevard	14.6
Wet " "	17.9

From these figures it appears that the least work is required on the dry Macadam and on the stone pavement; the work is greater with the wooden pavement and the wet Macadam. The experiments, however, are hardly numerous enough or given with sufficient detail to enable us to draw very exact conclusions.

THE *Local Government Chronicle* (England) suggests that the sewage of a town in a manufacturing district might be used in factories for generating steam. This is an extraordinary proposition to be made by a journal usually so well informed. The proprietors of steam-boilers would not thank any one for giving them water which would corrode their boilers and produce sediment in them to such an extent as sewage would.

PLUMBERS' CONGRESS AT THE INTERNATIONAL HEALTH EXHIBITION.

(Continued from page 557.)

No. II.

(From our Special Correspondent.)

MR. GEORGE SHAW, the Master of the Plumbers' Company, who acted as Chairman of the Congress, took substantial and indisputable ground in his opening address. He reminded his hearers that they were met to consider the question, not only as plumbers, but also as members of the general public, and that the advantages sought after were mutual to each class. He quoted from the ordinances of the Plumbers' Company laws and enactments of the reigns of Edward III., Henry VII., VIII., and Elizabeth, dealing with the questions of unlicensed plumbers, and of the persons who alone were allowed to take apprentices, and of their treatment when apprenticed, and further, of the regulations as to quality of material used. He wound up his address by laying down the principle that the object of the congress was not to debate mere technicalities connected with the trade, but rather to consider the broadest issues of the matter from the public and scientific as well as the trade point of view.

Mr. Ernest Hart then proceeded to read a paper on the necessity of supplementing the existing laws on house-drainage. As a medical practitioner, he pointed out not only the deterrent, but also the malignant effects of bad plumbing and drainage upon invalids and households. He reviewed at length the existing regulations for drainage under the Public Health Act. In the course of his remarks he pointed out that the legal requirements as to the necessity of constructing drains prior to the occupancy or building of new houses did not extend to rural districts, unless the local authorities on their own application were invested with urban powers, when the regulations, however, were not retrogressive. The model by-laws issued by the Local Government Board, for the use of such local authorities as wish for further powers—and the acceptance of which is again optional—represent the most stringent (if so strong a word is permissible) regulations in force anywhere. Under these, plans of proposed drainage must be deposited by builders with local authorities, and notice must be sent to the surveyor before covering in the drains. In the event of an adverse report on the part of the surveyor he has not, however, power to prevent occupancy of buildings. In the same way there is no authority over house-drainage in the metropolis, official authority terminating at the foot of the house-drain. In support of his position of the universality of bad drainage, Mr. Hart quoted Mr. Rogers Field, who recently stated that he found the majority of houses to be defective, and out of about 1,000 he had inspected he only found three that were sound. Statistics from the reports of the London and the Edinburgh Sanitary Protection Associations were also quoted, to show the enormous percentage of houses having direct communication between sewer and house, drinking-water cisterns and soil-pipes, etc. He recommended legislation prohibiting the use of improper appliances, such as D-traps, pan-closets, and insisting upon disconnection between sewer and house-drain. As a guard against improper workmanship, he advocated the systematic instruction of plumbers, the necessity of plumbers' licenses, and of independent inspection of work. He further advised that architects should be more definite in their specifications of certain articles and in their supervision of fixing the same, and recommended the embodiment of the model by-laws in a Building Act, the submission of complete plumbing and drainage plans for approval, and the testing and certifying of drains before the occupancy of the houses. As regarding plumbers, he urged the registration and licensing with the local authority, and after examination of all plumbers, the yearly renewal of such licenses, and the public advertising of the names of licensed plumbers. It will be seen that the main features of this plan are on all fours with the New York regulations, which, indeed, Mr. Hart warmly eulogized, as also their promoters and the gentlemen instrumental in obtaining the same.

Mr. Ernest Hart was followed by Mr. W. Eassie, with a paper on the "Technical Instruction of Plumbers." He insisted that a "special lustre" is attached to the trade, pointing out how few are competent to direct plumbing-work. The too universal habit of rating a plumber very low in the ladder of the social scale has been brought about by his own indifference in allowing nondescripts of every sort to practice the craft. Technical education goes far beyond the mere power to manipulate tools and adroitly to fit baths, lavatories, closets, etc. This constitutes mere

manual skill, which was possessed by the workmen of the second century, whose work, in the shape of wiped joints upon large-sized lead-pipes, welded joints and sluice, has lately been disclosed at Bath, at the site of the old Roman baths, now exhibiting in the exhibition. The reader regretted that the bulk of lectures delivered and books published for the trade have been of an elementary character, occupying to technical education the position simply of scaffolding to architecture. Technical knowledge consists, at least, of a fair knowledge of the history of the trade, of why certain metals are used for certain purposes, and whether any better can be substituted; in not merely fixing a pump of any given order, but in knowing its powers, and the reason, for instance, why an ordinary suction-pump cannot raise water beyond twenty-eight feet depth; in the calculation of amount of water yielded by a pump with certain head of fall, in order that proper-sized pipes may be used; in the ability to criticise, explain, or repair any given contrivance; in an acquaintance with the sciences of a trade, such as tearing and crushing strains for tanks and supporting-beams. Technical education should enable a plumber to measure up and to turn out proper bills of quantities. He should be able to see a weak point in a specification; for example, to point out in case an architect has forgotten to provide against syphonage in a tier of closets; he should possess a general knowledge of chemical properties of waters and acids, and their effect upon the materials in daily use. Mr. Eassie stated that in his experience as examiner in plumbing for the city and guilds of London Institute he had been shocked to see such bad sketching, faulty orthography, and wretched phraseology. He advocated the establishment of both written and *viva voce* examinations, combined with a practical exhibition of manual and general dexterity for the "honors" grade.

Mr. C. T. Millis, of the Technical College, Finsbury, followed, on the same subject. For the plumber of the future, the "sanitary plumber," as opposed to the mere worker in lead, he considered the requisite instruction under three heads. (1) Mechanical Drawing—Practical Geometry, including pattern-cutting and the making of working drawings from dimensioned rough sketches. (2) Practical Work—The manipulation of sheet-lead, and sheet-metal work, joints, including iron-barrel connections and general fittings. It should be borne in mind that practical instruction in this branch ought to be supplementary to workshop training, not as a substitute. (3) Physics—Laboratory work, lectures, and experiments, the latter to be given by the students, illustrative of lectures. The consideration of the properties of metals, their alloys, the composition of solder, etc. The laboratory should also be fitted with a stink-cupboard, for noting the effects of airs, gases, and acids on various metals. Experimental examinations of traps and other sanitary appliances. The reader insisted that it should be a matter of indifference to a plumber what material he worked. All external work, such as roofing, where zinc has lately been so generally used to the displacement of lead, the plumber should keep in his own hands, and not allow the zinc-worker or manufacturer of cowl, etc., to take away from him. A plumber having a knowledge of gas-fitting will be a much more useful man than the gas-fitter who tries to do a little plumbing; and seeing that, the plumber, the man called in to rectify anything that is "wrong with the pipes," should make it a point to supplement his knowledge under these general heads. The gas-fitters, who have been wiser in their generation than those plumbers who have held aloft from all knowledge of gas-fitting, and who have apparently learned to wipe a joint, have too often crept in as "sanitary plumbers," to the detriment of the real article. Mr. Millis refused to believe that *any bona fide* plumber would make a cement joint on a lead-pipe, of which so much had lately been heard; the discredit and abuse was brought about by these so-called "sanitary plumbers."

Mr. J. W. Clarke, the instructor of the plumbers' classes at the Polytechnic Institute, followed. He referred to the prevailing ignorance as to the real meaning of the words "technical education." Some men will ask indignantly if book-learning is better than years of experience. Technical education, as commonly understood, is not *practical* experience, and will never take its place. It supplies, however, the brains for the profession. Give two workmen on similar jobs say 4-inch swan-neck or double-bend; the one may spend an hour or so making a template to fit the position, while the second, by means of a few chalk-lines on the floor or bench, will have supplied his plan. The man who could save his time would not be the one to go when

the time came for one or other to be discharged. A slight knowledge of geometry will save a man's time when cutting out sheet-lead; knowledge of the nature of metals will direct the most suitable for use under varying circumstances and the necessity of protection from injurious contacts. A knowledge of "mechanics" is of unequalled importance to a plumber; new-fangled "patents" may have to be fixed, and the plumber is held responsible for their proper working. He may have to take it to pieces for repairs, and perhaps for renewal of worn-out portions, assuming thereby the same position as the man making it, who has had special training for the one particular fixture; moreover, he will have to be responsible for the proper working of the fixture. Even an elementary knowledge of hydraulics and hydrostatics is of great help to the plumber. *Capillary attraction* is very infrequently understood, and is yet provocative of much trouble. How seldom is it that architects give detailed drawings for the plumber to work from. At the most, a plumber expects to find in some corner of the foreman's office, among sheets of details giving sections of moldings and cornices, a straight line with a small circle (w. c.) on the ground plan, and another small circle (s. p.). In the specification there will be but a very meagre account of the architect's requirements, and a reference to the foreman or clerk of the works may bring a promise to ask the architect, the plumber being kept in the background, or it may bring extraordinary instructions. The remedy for this is, that the plumber should so educate himself that the architect will have sufficient confidence to consult with him. The plumber should know how to make a working drawing to submit for approval to the authorities, or that his fellow workmen, whether journeymen or foreman, may understand. The prevailing lack of knowledge of drawing among plumbers is one reason why he is so rarely appointed as clerk of works. A plumber is too frequently incapable of recommending really the best fitting to be used, owing to the absence of knowledge or study of the subject. His status is such that he is nearly always in trouble wherever he goes. The housemaid says something about "wipe your boots." A little later he gets a warm reception (in the lower regions); cook says, "You're not going to use my fire," while the lady of the house abuses the horrid fellow for making dirty finger-marks. Under existing circumstances the plumber is being pushed aside by "sanitary engineers," who have never had the least practical training themselves, but who are drawn from various trades—gas-fitters, brick-layers, linen-drapers, carpenters, compositors, jerry-builders, carpet-beaters, window-cleaners, *et hoc genus omne*—who are able to creep into a noble profession. Unfortunately, plumbers have no protection against them. These things, although apparent digressions, really tend to prove that technical education of plumbers is very necessary and should be taken up in earnest. Although holding that it should be the master's duty to teach apprentices, Mr. Clarke pointed out how seldom it was done in the workshop, and therefore advocated the establishment of trade-schools (not at the public expense), where the workshop-teaching would be supplemented. He pointed out that through the action of some of the city companies it was possible in any place where there were a few plumbers to establish a school. Unfortunately the plumbers themselves did not take the matter up. A difficulty presented itself in the shape of suitably qualified teachers. He urged that a plumber's work was in reality as much an art as that of the goldsmith, and that every plumber should and must have a proper training before he is able to execute work creditably.

Mr. Morby, Boro' Surveyor of Kings Lynn, read a very short paper from the boro' surveyor's point of view. He was thoroughly convinced of the necessity of technical education, not only for plumbers, but also for local surveyors and sanitary inspectors. If boro' surveyors could find courage to stand against a local board and insist on having everything done in the right way, he thought it would be of great assistance to plumbers.

In the general discussion following, Mr. John Smeaton upheld the necessity of establishing schools to teach the young rising generation, and of obtaining laws to uphold the trade. At present the plumber was an individual told to mind his own business if he ventured to indicate a flaw in any specification. Good teachers should be provided at technical schools, where certificates could be obtained.

A lively discussion on Mr. Ernest Hart's condemnation of the D-trap and pan-closet then followed, the speakers in its defense, headed by Mr. P. I. Davies, being quite enthusiastic in praise of these fixtures. It must be added that only a small proportion of the meeting was with them. Mr.

P. I. Davies also condemned the proposed licensing of plumbers, averring that Englishmen would not stand it.

Mr. W. P. Buchan, of Glasgow, offered his congratulations to the meeting on the existence of the congress. He also considered it absolutely necessary that the plumber should have technical education in order to improve his status, which education should be imparted in night-schools as supplementary to shop work. In illustration of the short-sightedness of some men to their own and the trade advantage, he quoted an instance in his own experience in which he had offered a man additional money if he would attend a school and so make himself more useful—an offer indignantly declined by the workman, who had to go in consequence. Mr. Malkin concurred as to the necessity of technical education.

Mr. Scott Moncrieff, C. E., Engineer to the North British Plumbing Company, followed with a telling speech. In his experience the great difficulty had been to supplement the "shop" with education at night. He could not think the steps now being taken would pass by without producing good results to the general advantage of the plumber, but he thought the meeting should do something to advance the matter into practicable form. The plumber should be the responsible person for the entire plumbing of a house, from the end of the soil-pipe to the disconnecting-trap. The education of a plumber should distinctly include a knowledge of everything necessary to make a house healthy from roof to sewer, and to him only should all responsibility belong and all blame attach. At present he is a factor of the builder, totally irresponsible, and unlike the members of any other profession, whose work speaks for itself and is visible and open for criticism and alteration. The plumber, if good, stands on no better footing than the bad workman, in both cases the work, all-important as it is, being covered in, whether bad or good, with no legal or other responsibility attached. As a direct outcome of Mr. Moncrieff's suggestion, the chairman a little later put it as a resolution to the meeting that "in future architects should not include plumbing-work in builders' contracts." As may be readily understood, this proposition met with unanimous approval.

Mr. Humphrey, of Nottingham, referring to the habit of covering up plumbers' work so that none of it should meet the eye, held that the public ought to be educated up to the idea that such work is not of so vile a nature that it should be hidden from view. The necessity to cover up his work took away to a certain extent a man's self-respect, and he became careless of his work, his pride to do it well and reputably not being appreciated. If the habit of showing it obtained, it would become impossible for inferior workmen to take work in large houses. It was his pride to say that he was consulted by architects on works in Nottingham, and he thought that once show the architects and the public that a plumber knew his business, and the former would feel a burden taken off their shoulders. He feared that almost exclusive attention had been given to perfecting manipulation and handicraft, the necessity of a knowledge of the chemical aspects having been lost sight of. To remedy this evil he thought the schools proposed would be of immense benefit.

Mr. Clutterbuck, speaking of the resolution in regard to builders' contracts, held that it was no saving to the architect to include the plumbing-work. A good plumber could usually, if treated with first hand, put better work in at a lower price than could be the case with a builder who had to cover two profits. Mr. Penrose, A. R. I. B. A., the present architect of St. Paul's Cathedral, also supported the resolution, and Mr. Wasborough, of Balham, held that the action of architects in including plumbers' with the builders' quantities had done more damage to the plumbing trade than anything else.

This concluded the discussion on the first head of the agenda papers.

(TO BE CONTINUED.)

THE SCHULKE RECUPERATIVE GAS-BURNER.

THE Schulke gas-burner is similar to the Siemens, in being recuperative, but it is claimed that the former gives better results. We have already called attention to this burner, which was exhibited by Mr. E. Servier at a recent meeting of the Société Technique de l'Industrie du Gaz en France. The following is a description of the burner, and some of the result obtained with it, taken from the *Revue Industrielle*.

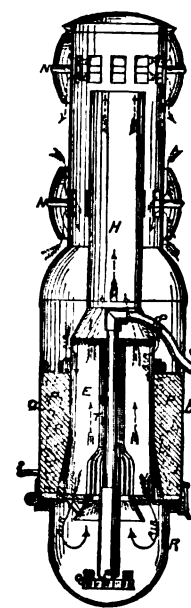
One of the interesting features of the burner consists in the recuperator, which is so arranged as to communicate to

the air-supply a large part of the heat carried off by the combustion. It is formed of a platinum plate folded in such a manner as to form a central tube, E, a transverse section of which resembles a star with many rounded branches, as seen in Fig. 2, which is a section of the burner through *a b*. This tube is surrounded by an envelope of non-conducting material, F. The air-supply passes down through the spaces G around the platinum tube, while the inside of the tube serves for the removal of the products of combustion. In order to facilitate the heating of the air the sides of the tube are corrugated, and the air-spaces are made quite narrow. The sides of the tube become red-hot, and the air-supply is thus heated to a very high temperature. The openings M serve for the introduction of the air, and are protected by the hood N. The products of combustion escape by the openings O, also protected by a hood, N; and to avoid irregularities in the flame by strong draughts, the openings M and O have equal sections.

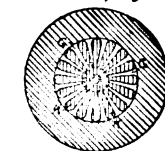
The gas enters by the tube P, and is distributed to a crown of slit burners, Q, so arranged as to avoid the joining of the flames. The flames are surrounded by a glass cup, R, fixed into a hinged frame. S serves to light the burner without opening the cup, nor the lantern which surrounds it, in case the burner is used for out-door illumination.

In most recuperative burners it is found that before the draught is established the flame is extinguished by the fall of the products of combustion, cooled by the sides of the recuperator. To remedy this Mr. Schulke has devised in

FIG. 1.



SECTION



SECTION AT a-b

FIG. 2.

the centre of the folded tube a chimney, T, which is enlarged toward the base, and is transformed into a true combustion-chamber, U.

The following table shows some of the results obtained with different sizes of this burner. For convenience litres have been converted into cubic feet, and carrels into candles:

No.	Consumption, cubic feet.	Candle-Power.	Candles per foot of gas.
1	5.29	34.56	6.53
2	7.06	49.90	7.07
3	10.59	92.16	8.70
4	17.65	140.16	7.94
5	26.47	219.84	8.30
6	35.30	307.20	8.70
7	52.95	480.00	9.06
8	70.60	691.20	9.79
9	105.90	1,075.20	10.15
10	141.20	1,440.00	10.20

In case of the breaking of the glass cup R, the recuperator stops immediately, and the burner acts as an ordinary burner.

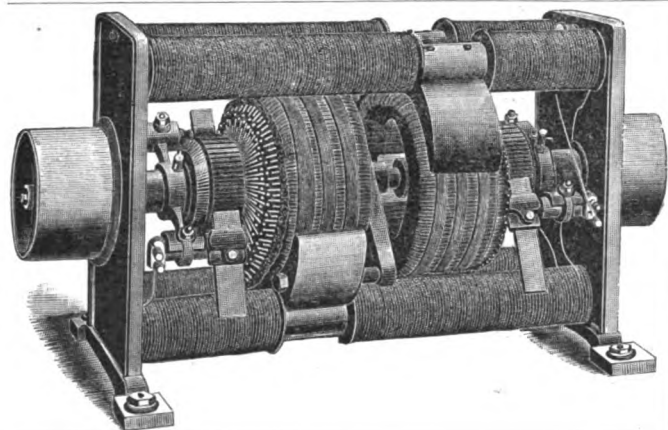
ELECTRIC-LIGHTING EXHIBITS AT THE INTERNATIONAL ELECTRICAL EXHIBITION. No. IV.

(Continued from page 557.)

THE BALL SYSTEM.

THE Ball Electric Manufacturing Co., limited, of Reading, Pa., exhibits what is termed a "unipolar inductor dynamo," and arc-lamps, invented by Mr. Charles E. Ball. This dynamo is so peculiar in construction as to warrant more than a passing notice. The most recent form of the machine, as exhibited, is shown in the accompanying illustration. It consists, in reality, of two like machines, similarly arranged in the same frame and run together, though the current from either may be used alone. The two armatures are each induced by one pole only, and there is an armature before each pole. This method of construction adapts the machine to a variety of purposes. Each part may be used separately, one for arc and the other for incandescent lamps, or both in series, thus obtaining double potential, or in multiple arc, thus doubling the quantity.

Among the other peculiarities of the machine are its lightness, thinness of wrapping on the armatures, and large number of sections in the commutators. The machine in operation, running seventeen 2,000-candle-power lamps, though rated at only ten, is said to weigh but 520 pounds.



The wrapping on the armatures is never more than three-eighths of an inch in thickness, the inventor believing that every armature having wire over half an inch in thickness will burn out eventually, on account of the heat generated in the interior not being able to radiate out through more than that thickness. Each commutator of the 10-light machine contains ninety sections, or 180 in both. The smallness of the belt used—one inch for a 10-lamp machine actually running 17—is noticeable. The speed used is 1,800 revolutions per minute for seventeen lamps, and 1,250 for ten lamps, the circumferential speed being rated at 3,900 feet per minute. About 9-horse-power is said to be used for running seventeen lamps. The present form of the machine, as illustrated, has been in use about eighteen months. A plant of 100 2,000-candle-power arc-lamps is in use in the public illumination of Scranton, Pa., and about 130 in Jersey City. Some 650 lamps in all are now run by this dynamo in the United States, Canada, and England.

Mr. Ball also shows an arc-light in a sealed globe, thus excluding the oxygen from the burning carbons, so that they last much longer, even as long as a week, without replacing. The distribution of the light, however, is not so good.

(TO BE CONTINUED.)

THE INTERNATIONAL HEALTH EXHIBITION. No. XXIV.

(Continued from page 506.)

It is proposed in these letters to devote a portion of each to features of general interest, the remainder to describe exhibits of a technical nature, which will be illustrated when necessary. Specialists are employed for technical work, with a view to confining descriptions to such articles as are likely to be novel to the readers of THE SANITARY ENGINEER.

MECHANICAL REFRIGERATION.

In the Western Annex are exhibited a number of machines for producing artificial cold by mechanical means. The general principle of all the machines is the same, and depends upon the condensation or compression of atmospheric air, the removal by cold water of the heat produced by condensation, the cooling of the compressed air to a temperature approaching that of the atmosphere, and the subsequent release of the condensed air, which, by its expansion, becomes cooled to a low degree of temperature.

These machines are particularly applicable to use on steamships, as an abundance of cold water for cooling the compressed air is to be had for the pumping, and the necessary steam-power is also available. But the machines are also used on land in breweries, oil-works, abattoirs, chocolate-works, etc. Several of the exhibitors show cold storage-rooms, the temperature of which is indicated by thermometers, and which contain frozen carcasses of New Zealand mutton, frozen, in some cases, a number of months ago.

The Bell-Coleman Mechanical Refrigeration Company, 45 West Nile Street, Glasgow, which has its machines on a large number of Atlantic and other steamers, has a small machine working at the stand of Messrs. F. Allen & Sons, chocolate manufacturers, in the West Gallery.

Messrs. J. & E. Hall, 23 St. Swithin's Lane, London, E. C. (exhibit No. 1,255), and the Haslam Foundry and Engineering Company, Derby (No. 1,248), also exhibit machines of the same general principle and intended for the same general purpose.

Messrs. Siebe, Gorman & Co., 187 Westminster Bridge Road, S. E. (exhibit No. 1,243), show an ice-making apparatus and a "Universal dry-air refrigerator," the invention of Mr. T. B. Lightfoot, M. Inst. C. E. The cold is produced solely by the expansion of compressed air, no chemicals being employed. The special features claimed

as those of the "Universal dry-air refrigerator" are its simplicity and its noiselessness as compared with other similar machines; it is further claimed that the price is in consequence so much reduced that means of refrigeration is now brought within the reach of butchers and other small tradespeople. Another matter on which great stress is laid by the inventor is the arrangement for drying the air, which is entirely contained in the bed-plate, the moisture being run out every morning or evening in the form of water by merely opening a small tap, and in this way the formation of large quantities of snow in the cooled air is effectually prevented. These machines are made in the United States by the Lightfoot Dry-Air Refrigeration Company, of Rochester, New York.

The essential details of the machine are shown in the accompanying cuts.

The air enters by the pipe A into the water-jacketed cylinder B, where it is compressed to a pressure of about 50 pounds per square inch above the atmosphere, and delivered through the pipe C into the tubular coolers D D, contained in the bed-plate. Here the heat of compression is abstracted by means of cold water circulated by the pump E, worked from one of the valve eccentrics, and the cooled compressed air then passes by the pipe F to the cylinder G, in which it is expanded behind a piston down to its original pressure, and is thereby cooled to a temperature of about 60° or 70° below zero, Fah. By increasing the working pressure, however, a still greater degree of cold can be obtained, but for all ordinary purposes this is not necessary. H is a steam-cylinder of usual construction for giving the necessary motive-power, as the difference between the power used in compression and that given back during expansion, plus the friction of the apparatus, has to be obtained from some external source. In place of steam gas can be used, or if desired the machine can be driven by a belt from any existing shaft, this latter plan being probably the best and most economical for small refrigerators, as the motive-power can then be used for general purposes as well as for driving the machine.

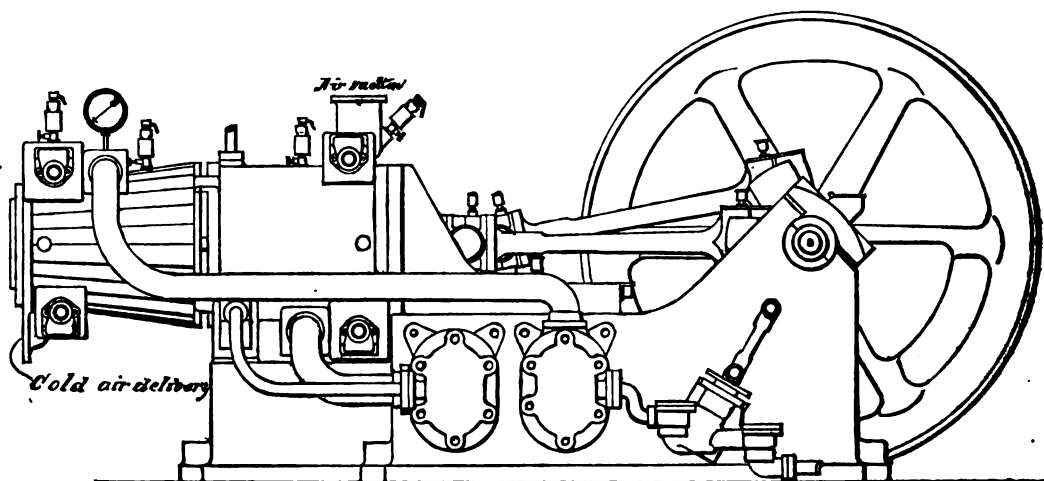
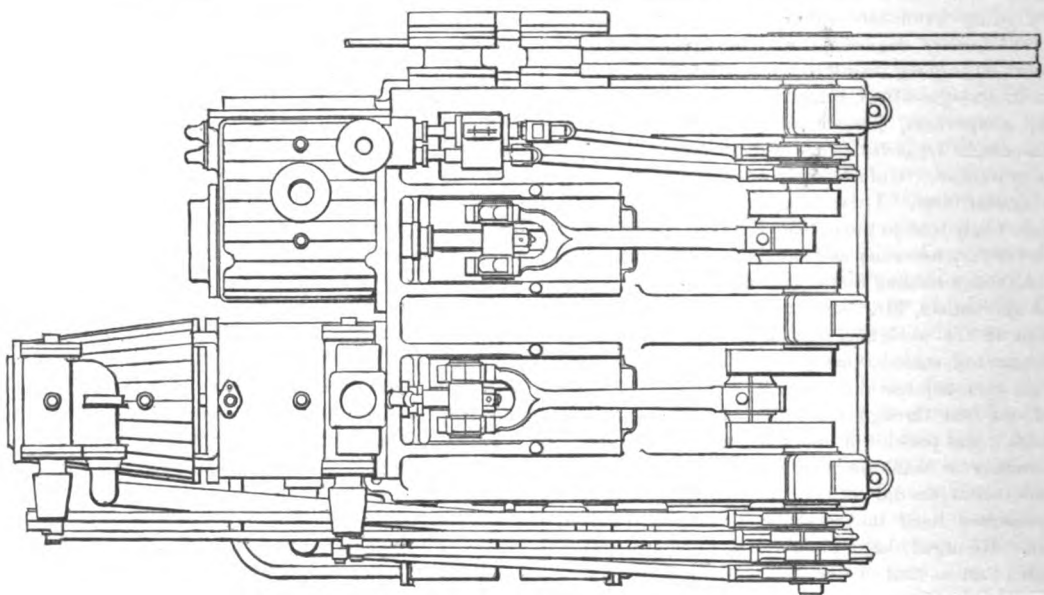
Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

MAGAZINE-BOILER.

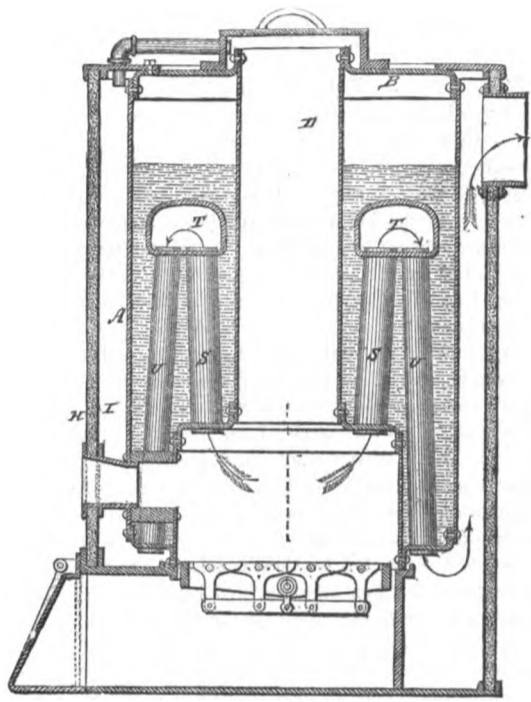
We present this week a novel magazine-boiler, the invention of Mr. Arthur H. Fowler, of Newark, Ohio.

It is composed of a vertical shell, A, with a central magazine, D, which is flanged to the upper head-sheet B and to the crown-sheet of the fire-box E. The inner circle of



LIGHTFOOT REFRIGERATION MACHINE.

tubes S, instead of extending the whole length between the crown-sheet of the furnace to the upper head-sheet of the boiler, extends but two-thirds of the distance and terminates in an annular smoke-connection, T, which is all lower than the water-line of the boiler. From this annular smoke-connection another set of tubes, U, of somewhat smaller diameter, but of increased number and giving about the same cross area, drop to the bottom of the "water-leg," forming a return or reverberatory passage for the gases of combustion through the water of the boiler before allowing it to escape into the outer flue, formed by the doubled-iron jacket I and H. The space between the jackets is filled with a non-conducting material to prevent



an excessive loss of heat in this direction. Another feature of the boiler is a double magazine. When hard-coal only is to be used the magazine D, as shown, only is used, but where it is desirable to use soft-coal a central or inner magazine is placed within the principal one, the annular space between them being filled with small hard-coal, and the inner one, which is tapered, being largest at the bottom, is filled with soft-coal. This, it is claimed, will cause the soft-coal to feed into the centre of the fire, with the hard-coal surrounding it, causing less smoke—or not producing it—than would be the result with soft-coal alone and preventing the stoppage of the tubes with soot.

CONNECTING A KITCHEN-BOILER WITH ONE OR MORE WATER-BACKS.

No. I.

It frequently happens that the kitchen-boiler must be connected with two or more ranges. Sometimes the reason is that the water-back in a laundry-range must be connected with it for the purpose of getting more hot water on washing days, and again it frequently happens that a winter kitchen is on the first floor of a house, and that the summer kitchen is in an extension or in a basement. This sometimes happens and admits of several combinations. Sometimes they are a matter of choice, but more often of necessity.

When one range is in an upper room above another range in a room below, the diagrams *a*, *b*, *c*, and *d* illustrate the principles involved in the forms usually met with.

Diagram *a* is used when a boiler is provided with *two* side couplings and *two* bottom couplings, one set for each range. This requires just a little forethought and the knowledge that two water-backs are to be used. The increase in cost is inconsiderable, and it permits of entirely separate connections, which can in no way interfere with each other by influencing the flow of the water in either. From the lower water-back the flow of water will be more rapid than from the upper one, assuming they are alike in size and construction. The reason for this is that the up-take or flow-pipe and its return-pipe is so much longer, perpendicularly, than the same pipes from the upper water-back, that there is a greater relative difference of weight between the up-take and its corresponding return, that this difference increases with the increased lengths of the pipes, but in a very much inverted ratio, but still considerable and very marked to an observing plumber.

This (*a*) presumably is the most suitable connection for double ranges, but under one condition, at least, an objection has been made to it. It is claimed that should the lower range be in a cold or exposed place and no fire in it, the water in the water-back and in the pipes leading to and from it will be inert—that is, have no circulation—and that they may freeze. This presumption is reasonable, and a method of securing a circulation from the boiler through them sufficient to prevent freezing is something for thoughtful plumbers to take into consideration.

In the case of the upper water-back and pipes freezing when the lower one is in use, the danger is not so great. The heat of the boiler is generally sufficient to warm the room beyond the danger of frost, and should the dampers of the stove be closed so as to prevent a strong draft over the water-back the danger is reduced to a minimum.

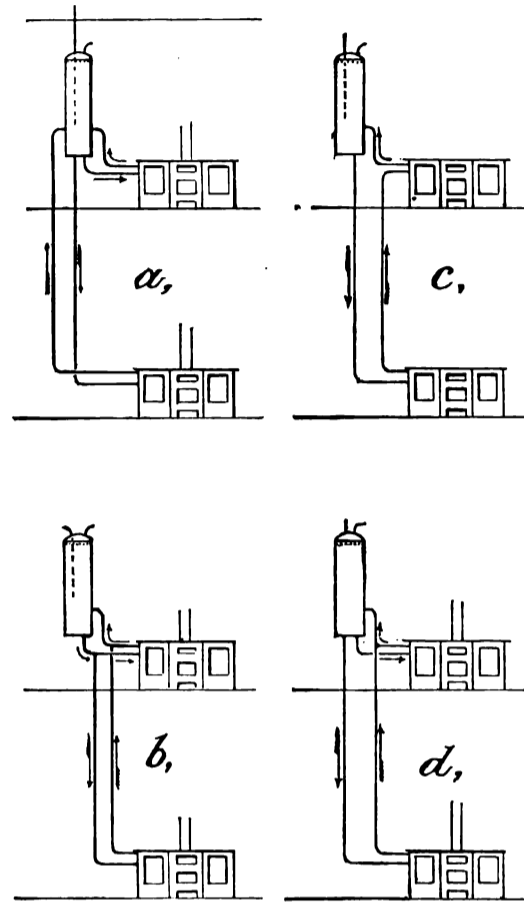
Diagram *b* shows the method generally followed when there is but one set of couplings on the lower part of the boiler. It is claimed by some that with this arrangement of pipes the water in neither back can freeze so long as one of the ranges is in use. It is claimed, for instance, that should the upper range be in use, the hot water flowing from the back into the boiler will draw the water from the lower back by induction, as it passes over it, thus keeping up a circulation through it from the return-pipe. However, this may be questioned. Of course, one can imagine how the stream of warm water from the upper range flowing over the end of the up-take pipe from the lower one may draw water out of it; but if we look a little further we will also see how the return-current to the water-back in the upper range will also be trying to draw water from the return-pipe to the lower water-back by the very same inductive principle which is applied to the other pipe, and that they may be assumed to balance each other and make abortive any claim that can be put forth for the principle. However it may be that some accident of construction—some peculiarity of the making of a joint in lead pipe, for instance—may make one of the joints at their junctions a more favorable injector, if we may use the word, than the other, and that by this means the water will move in some one direction, which is just as likely to be drawn up through the return-pipe and into the water-back as passing up through the flow-pipe and into the boiler. As said, in lead-pipe this can be assumed as likely to happen, but with brass or iron pipe the conditions of the junctions will be always the same, and positive circulation in the lower water-back without fire cannot be assured.

Diagram *d* shows a method with which there is some hope of getting a positive circulation of the water through the lower back when the fire is out. It will be noticed that the flow-pipe from the upper back enters the flow-pipe from the lower one some distance below the side coupling of the boiler, and that there are two bottom couplings. The fact of there being *two* separate return-connections produces the result that there can be no inductive influence from one to the other on the return-flow in either. But, again, the fact of the upper flow-pipe joining the lower one at the level of the upper back makes it reasonable again to assume that here an inductive influence may be at work. If instead, as in the diagram (*d*), the flow-pipe from the lower back entered the flow-pipe from the upper one, as in diagram *b*, there would appear to be no doubt of an induced circulation through the lower back. As *d* is now drawn it is the most favorable for the inducing of a current through the upper back, if the lower range be in operation and the upper one cold.

Diagram *c* is a method which is claimed to be positive. The water is passed through the lower back first, then through the upper one, and into the boiler. When the lower range is in use this cannot be other than a positive method. On the other hand, when the upper range only is in use, there is reason to believe this method will not circulate freely under all conditions, and that at its best it will not do as well as separate or branched connections.

The effect of this is to make a great *dip* or *trap* in the return pipe. To have it circulate at all, the sum of the weight of water for a given height in the *two* flow-pipes—that is, the pipe from the lower back to the upper one and thence to the boiler—must be less than in the return-pipe, the perpendicular length of the return-pipe to be considered as just equal to the length of the combined flow-pipes; that part of the boiler below the side-coupling being considered as part thereof. In this diagram (*c*), therefore, we have the water in the return-pipe of unknown density, but which we know to be less than in the flow-pipe between the water-backs, and greater than in the flow-pipe from the upper

back to the boiler, having a power to produce the circulation, which we may illustrate this way: Assume the value or density of the water in the pipe between the two water-backs to be 100, as it is the coldest; assume the value of the down pipe to be 90, as it has not traveled so far nor through the water-back, and then assume the value of the water in the pipe from the warm back to the boiler to be 80. If we do so it will have $100 - 90 = 10 + 80 = 90$, or just



a balance and no circulation. If, on the other hand, we can give the pipe from the hot back to the boiler a value of 70 only, it will give a combined weight to this column only of 80, and as the corresponding cold column has a value of 90, the circulation will go on. But again, if we give it a value of 85 we will have a heavier column in the up-take side than on the return side, and an irregular, spasmodic effort of the water and steam to pass into the boiler will be the result every time the water in the back gets hot enough to make steam and force itself into the boiler during the momentary change of value in the weights of the columns due to the steam. An objection to this method, should it be used for the purpose of an increased quantity of hot water, and if both the water-backs would be constantly in use, is that the water, after passing through the first back, has been warmed so much that it cannot extract an equal quantity of heat in passing through the second back, and that consequently *two* backs separately connected to a boiler will warm more water in a given time than *two* backs connected in continuous order, as shown in diagram *c*.

(TO BE CONTINUED.)

Reviews of Books.

WATER-WORKS REPORTS FOR 1883-4.

Sixth Annual Report of the Board of Water Commissioners of the Village of Johnstown, N. Y., for the year ending April 30, 1884.

Thirteenth Annual Report of the Board of Water Commissioners of the City of New London, Conn., September, 1884.

Eleventh Annual Report of the Board of Water Commissioners of the City of Yonkers, N. Y., December, 1883.

The village of Johnstown, N. Y., which, by the U. S. census of 1880, had a population of 5,013, is supplied with water from an impounded brook by gravity. The report of the commissioners is brief. There is none of the boasting which is so frequently found in the reports of water boards, to the effect that the works are bringing in an income largely in excess of the expenses. The revenue, \$6,394.13, is in excess of the regular expense of maintenance and extension of the works, which was, as well as can be ascertained from the figures given, \$3,975.33. The surplus was used in paying part of the cost of an alteration in the mode of supply, which doubles the capacity of the works and which cost \$7,067. This change, which was made on the advice of Stephen E. Babcock, C. E., and

under his direct supervision, was effected by the construction of a small stone dam 100 feet below the old leaky timber dam at the impounding reservoir, thus forming a small basin which collects all the water of the stream. From this basin a 12-inch stoneware pipe is laid on a regular grade for 3,600 feet, and from that point to the distributing reservoir, a distance of 1,200 feet, with a fall of 90 feet, 8-inch cast-iron pipe, removed from the former conduit line, is laid. For 1,200 feet from the dam the earthenware pipe is laid with open joints in a saturated quicksand, the object being to collect the ground-water. The remaining joints are cemented. It is not stated in Mr. Babcock's report how the quicksand is prevented from entering the pipe and choking it. The pipe is reported as having delivered by measure 550,000 gallons a day. The result of this experiment will be watched with interest by engineers, as several instances of the failure of similar conduits are recorded.

The report of the commissioners states that there are 501 service-taps in use, but does not give the length of pipe for distribution nor the number of fire-hydrants.

From the treasurer's report it appears that the interest on the bonded debt, amounting to \$3,630, is paid out of the village tax levy, which is good practice, and is preferable to making the consumers alone pay it. The amount of the debt is not given. It is perplexing to attempt to make the treasurer's detailed report of disbursements agree with his summary of the same. The detailed statement of vouchers paid foots up \$9,059.21, and includes \$7,067 paid for the new conduit. The summarized statement of accounts gives the disbursements on the year's account as \$6,040.83, of which \$2,457.91 is on construction account. It is also stated that audited bills to the amount of \$5,001.50 have not been paid. If the taxpayers of Johnstown can find out from these statements what their water-works have cost them last year, they must be possessed of a good deal of arithmetical ability.

The New London report differs from the Johnstown report very greatly in this respect. The financial statements are clear and concise. The sources of revenue and the items of expense are plainly stated. Since the works were begun, thirteen years ago, the expenditures have been \$317,512.99, and the income from water-rates has been \$165,392.45. The cost of maintenance for the year ending September 3, 1884, was \$3,622.33, and the revenue from water-rents was \$19,027.08. The report of Mr. W. H. Richards, the Engineer and Superintendent, is a businesslike statement. The supply is by gravity, and it is rare in such cases to find that any effort is made to discover the amount of water used. Mr. Richards, however, keeps a record of the pressure in the mains by a recording-gauge, which enables a very close approximation to be made to the consumption, by observing the variations of pressure consequent upon variations in the hourly draught of water. The average draught for the year was 864,000 gallons daily. As there are 1,501 services, the average daily consumption per service is 578 gallons. This is too great, but it is stated to be owing in a great measure to the bad condition of the cement-lined sheet-iron pipe which was used for street-mains, and which is now rusting out and leaking. The number of leaks and breaks which occurred during the past year was 68, or more than three to each mile of pipe. An interesting fact is given regarding the amount of water used in summer for sprinkling the streets. A rainy day was found to reduce the draught of water from the reservoir by 400,000 gallons. Only 26 meters are in use.

The population of New London in 1880 was 10,537. That of Yonkers, N. Y., was 18,892. In the latter city there were last year only 1,320 connections with the mains, and the daily use of water by each was 944 gallons, although there were 733 meters in use. The consumption per unmetered tap was 1,264 gallons per day. As the consumption per metered tap was 612 gallons per day, including the supply to several large factories, it would appear as if one-third of the amount of water pumped is used for street-watering and fires and building purposes. As Mr. Wilson, the Engineer and Superintendent, states in his report, "it is quite impossible to estimate, with such a degree of accuracy as would make such an estimate of any value, what proportion of this water is chargeable to downright loss and waste." Whatever the cause may be, the consumption is very great for the number of taps.

The Water Commissioners, in their report, do not give the cost of the works up to the present time. The expenses of maintenance and operation for the year were \$14,473.81, and the revenue from water-rents \$29,720.09. The excess of revenue is transferred to the city to be applied to payment of interest on the water bonds. There is a remarka-

ble difference in the duty of the two pumping-engines. One pumped 74,000,000 foot-pounds for each 100 pounds of coal, and the other less than 50,000,000. The Wright engine, which did the greater duty, is the more expensive machine of the two, but the economy of coal in using it probably more than counterbalances the extra cost. Beyond the construction of a brick tower containing a tank for high-service supply, there was nothing very noteworthy in the operations of the past year, but the report of Mr. Wilson is full of important statistical information regarding the works. In one respect it might be altered to advantage. A very complete tabular statement is given of the expenditures and receipts for each year since the construction of the works in 1877, analyzing the same with reference to the amount of water pumped and used. In this table the quantities of water are given in cubic feet, instead of gallons. It is very true that this may be the most rational unit of comparison, but it is an uncommon one, and affords no basis for comparison with other works, except by a computation which is tedious. If Mr. Wilson would use gallons instead of cubic feet, his table would be more useful as being more readily understood, not only by the average water-works official, but by the public and taxpayers, who as a class are not accustomed to think in cubic feet, and have no conception of its capacity.

This notion of Mr. Wilson only complicates his report, and renders it almost unintelligible to the many water-works superintendents, who want to know in simple English what has been done, with a view to comparison with other works.

FORTY-SECOND REPORT TO THE LEGISLATURE OF MASSACHUSETTS RELATING TO THE REGISTRY AND RETURN OF BIRTHS, MARRIAGES, AND DEATHS IN THE COMMONWEALTH, for the year ending December 31, 1883, with editorial remarks by Frank Wells, M. D. 161 and 193 pp. 8vo.

This adds another link to the most valuable chain of reports on vital statistics which has been put together in the United States. It appears from this report that the rate of increase of population is considerably lower than in most of the leading European nations, France and Hungary being the exceptions. In this connection the following table will be found of interest:

RATES OF BIRTHS, MARRIAGES, AND DEATHS IN VARIOUS COUNTRIES IN 1880.

COUNTRIES.	Birth-rate.	Death-rate.	Excess of Birth-rate over Death-rate.	Marriage-rate.
Massachusetts.....	24.8	19.8	5.0	17.4
England and Wales.....	34.2	20.5	13.7	14.9
Denmark.....	31.8	20.4	11.4	15.2
Sweden.....	29.4	18.1	11.3	12.6
Austria.....	37.3	29.6	7.7	15.1
Prussia.....	37.9	25.5	12.4	15.4
Netherlands.....	35.6	23.6	12.0	15.0
France.....	.....	.....	.....	.....
Hungary.....	42.9	38.6	4.3	18.2
Switzerland.....	20.6	21.9	7.7	13.6
Italy.....	33.6	30.5	3.1	13.8
German Empire.....	37.7	26.1	11.6	15.0

It will be seen from this table that, while the proportion of marriages to the population is greater in Massachusetts than in any of the countries named except Hungary, the birth-rate is less than in any country. To what extent this may be due to an incomplete return of births in Massachusetts we are not informed.

The death-rate is probably calculated upon nearly complete returns, and is fairly satisfactory, being about one-quarter of one per cent. lower than the mean for the thirty years previous. The editor concludes that while both consumption and cancer are increasing in numerical fatality, the mortality-rate from the former is steadily increasing, while that for the latter is progressively decreasing. The principal causes of death during the year were: Consumption, 5,931; pneumonia, 3,045; heart disease, 2,153; old age, 1,968; cholera-infantum, 1,941, and diphtheria, 1,091.

THE UNITED STATES EXHIBIT AT THE INTERNATIONAL HEALTH EXHIBITION.

(From the Pall Mall Gazette.)

THE practical value of much that exists at the Health-eries is apt to be overlooked in the enjoyment to be derived from the counter-attractions of music, illuminations, and the holiday portions of the show. The United States is represented by one exhibit alone, where the editor of THE SANITARY ENGINEER, New York, has, with commendable enterprise, brought together a general representation of American sanitary-work as exhibited in the laws, and drawings illustrating their practical application in the model

tenement-houses, and in the printed forms used in enforcing the tenement-house and plumbing laws in America. The recent discussions on the dwellings of the poor question in this country, and the suggestiveness of much that is here exhibited, will no doubt attract attention. The *Lancet* declares that this exhibit should be examined by all medical officers and sanitary legislators, as the difficulties which have been successfully surmounted in New York are even greater than those that beset us in London.

Correspondence.

CREDIT TO WHOM CREDIT IS DUE.

62 CHATERTON ROAD, BLACKSTOCK ROAD,
FINSBURY PARK, W.,
LONDON, November 3, 1884.

To the Editor of THE SANITARY ENGINEER:

I TAKE the opportunity of writing to you, as I find it my duty to do so, on behalf of credit that has been given to another man who is not entitled to it. A report was published in THE SANITARY ENGINEER, July 10, 1884, New York, in connection with the specimens of plumbers' work shown on the stall of the West Central Sanitary Engineering Company in the International Health Exhibition, London. You have sketches of the specimens of plumbers' work shown and the maker's name. Figures 2, 3, 5, 6, and 16 were made by me, and some of the specimens I sold to Mr. Smeaton, Sr. Those were not made on his premises. As I made these first-class pieces of work, why should I not have the credit of my own work? I am worthy of it, and nobody else is; this is what I want, sir. Please correct this false report and let me have the credit of my work. I don't think for a moment that you wish false reports in your paper. I should have written about it before this time but thought it would be corrected, for there is great dissatisfaction about it in the trade; they all know that I did the work. I have had a letter from my brothers in the trade in New York asking why I don't try and have it corrected. I am very well known in New York and Philadelphia; I only left New York a very short time ago, and it would please your subscribers at home and abroad if you would kindly do me this great favor, which I have no doubt you will.

I remain yours truly, THOMAS ROSS.

[We print the above letter, and beg to assure the writer that we simply printed a report, prepared by one of our special correspondents in London. He probably was not informed as to who made the particular specimens. If he had been he certainly would have mentioned the fact in his report. THE SANITARY ENGINEER is always glad to give a practical workman credit for skillful workmanship.—ED. SAN. ENG.]

CATCH-BASINS.

DALLAS, TEX., November 14, 1884.

To the Editor of THE SANITARY ENGINEER:

PLEASE ask some of your correspondents to give me a plan of a catch-basin to be used in livery-stables, which will prevent the sand, and mud, and saw-dust from getting into the sewer-pipes. Respectfully,

W. M. JOHNSON, City Engineer.

BALTIMORE, October 29, 1884.

To the Editor of THE SANITARY ENGINEER:

CAN you give me any idea of the relative cost of hot-air, hot-water, steam, or coal stoves for heating an ordinary well-built private dwelling of three stories in central New York? The building is of brick. Please give relative first cost, as well as cost of running. J.

[We do not understand whether you refer to the cost of the plant or the cost of maintenance. If you refer to the cost of the plant, stoves are the cheapest, and then will follow the furnace, steam, and hot-water, increasing in cost in the order mentioned. If you refer to the maintenance (fuel) it will be found that stoves and furnaces cost the most, and that hot-water and steam follow in the order mentioned.]

BISULPHIDE OF CARBON AS A DISINFECTANT.

M. CRIANDI-BEY has made a communication to the French Academy, setting forth the claims of an aqueous solution of bisulphide of carbon as a disinfectant. The bisulphide is but slightly soluble in water, a litre of water at the ordinary temperature dissolving only two or three milligrams. The solution is, however, a vigorous antiseptic, arresting all fermentation and killing all microbes. This solution is recommended for watering the streets, but the odor of the commercial article is certainly not in its favor.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING NOVEMBER 8, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.	Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrhoal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.					Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.		
													Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.							
NORTH ATLANTIC CITIES.																										
Portland.....Maine.....	35,000	17	25.3	3	17.6	1	1	3	1	2	2	2	2	2	2	20	11	1								
Boston.....Mass.....	435,000	196	23.4	61	31.1	6	2	30	5	6	14	1	8		5	20	2	2	2	1						
Lowell.....Mass.....	71,500	24	17.4	11	45.8			6	1	2	2					2	2	2								
Worcester.....Mass.....	69,000	25	18.8	12	48.0	1		3	5	2	1					1	2	2								
Fall River.....Mass.....	67,000	33	25.6	16	48.4		1	1	1	2			3		1	2	2	2		1						
New Haven.....Conn.....	69,500	26	19.4	7	26.9	2	1	2	1				2			3										
Providence.....R. I.....	125,000	35	14.5	8	22.8	2		4			3		2			2		1								
Total.....	872,000	356	21.2	118	33.1	12	5	49	14	10	22	1	17	6	30	17	1	1	1							
EASTERN CITIES.																										
Albany.....New York.....	103,000	36	18.2	15	41.6			6	6	1	1			1		3	1									
New York.....New York.....	1,355,000	628	24.1	234	37.2	26	2	104	19	34	38		22	7	7	60	35			8	4			7		
Brooklyn.....New York.....																										
Hudson County.....New Jersey.....	225,000	98	22.6	28	28.5	3		7	4	3	2		5	2	5	8	2		1	7						
Newark.....New Jersey.....	154,000	70	23.6	33	47.1	2	1	4	6	2	11		1	2	1	3	1	1		1	1					
Philadelphia.....Pa.....	940,000	341	18.9	114	33.4	5	1	57	27	6	19	2	9	3	4	29	10	1		1					2	
Wilmington.....Delaware.....	50,000	29	30.2	11	37.9			1	5		5															
Total.....	2,827,000	1,202	22.1	435	36.1	36	4	179	67	46	76	2	37	13	17	103	2	48	1	9	13				9	
LAKE CITIES.																										
Buffalo.....New York.....																										
Rochester.....New York.....																										
Cleveland.....Ohio.....	210,000	65	16.1	29	44.5			6	3	2	12		5	1		4	3			8						
Detroit.....Michigan.....	140,000	51	18.9	21	41.1			6	4	1	12														1	
Chicago.....Illinois.....	650,000	210	16.8	105	50.0	7	1	12	13	8	27	1	9	1	9	10	1	2		4	2					
Milwaukee.....Wisconsin.....	147,000	45	15.9	24	53.3	1	1	4		2	2		1			1	1	2		2						
Total.....	1,147,000	377	16.8	179	48.2	9	2	28	20	13	43	1	15	2	9	15	5	5	1	8	7	2			1	
RIVER CITIES.																										
Pittsburg.....Pa.....	210,000	66	16.3	32	48.4	5		7		4	14	2	3			2	1	1		1						
Cincinnati.....Ohio.....	275,600	110	20.7	40	36.3	1		10	4	7	2		3		1	3	2		14	1						
Louisville.....Ky.....	137,000	62	23.5	12	19.3	2	2	8	1	1	2		8			7	1	1		1						
Indianapolis.....Ind.....	94,000	17	9.4	4	21.5		1	2					1	1		3	1									
Evansville.....Ind.....	34,000	11	16.8	7	63.6			1	2	1	3		1	1											1	
Kansas City.....Mo.....	75,000	17	11.8	6	35.2	2		2	1				2			2										
St. Louis.....Mo.....	375,000	168	23.3	64	38.0	3		22	3	7	21	1	5	6		15	6	5							1	
Total.....	1,200,600	451	19.5	165	36.5	13	3	61	11	20	42	3	23	8	1	12	8	9		15	2				2	
SOUTHERN CITIES.																										
District of Columbia.....	Wh.....	133,800	49	19.0	12	24.4	2	8	1	3			2		3	5	3		1							
Richmond.....Va.....	Wh.....	41,000	14	17.7	4	28.5							1			1	3	2								
Charleston.....S. C.....	Wh.....	25,000	15	31.2	4	26.6		2		1	3		1													
Atlanta.....Geo.....	Wh.....	27,800	27	50.6	12	44.4		3		1						2	1									
Augusta.....Geo.....	Wh.....																									
Savannah.....Geo.....	Wh.....																									
Nashville.....Tenn.....	Wh.....	35,100	13	19.2	4	30.7	1	2		2	3					1										
New Orleans.....La.....	Wh.....	171,000	96	29.2	11	11.4	5	17	1	11	2		1	11	1	1		1								
Total White.....	405,000	187	24.0	35	18.7	8		29	2	17	10		7	1	12	8		1								
Total Colored.....	213,800	152	37.0	50	32.8	15		17	2	13		1	1	3	4	9	4	2	1							
Total in 29 U. S. Cities.....	6,666,300	2,719	21.2	682	36.1	93	14	363	116	119	193	8	100	38	37	197	19	82	4	33	25	2			12	
Total for 5 weeks ending November 1, 1884.....	6,540,940	13,302	21.1	5,385	40.4	459	85	1,696	348	1307	641	18	482	301	162	665	60	343	15	90	112				146	
October 25.....	Total in 28 English Cities.....	8,762,354	3,517	20.9		118				105	32		66		67										46	
" 25.....	8 Scottish Cities.....	1,254,607	517	21.4		15				21	15		15		19										15	
" 25.....	16 Irish Cities.....	858,660	389	23.6		9		32		16	4		9		18			85		22					7	
" 18.....	139 German Cities.....																									
" 25.....	15 Swiss Cities.....	455,537	171	19.5		5		31		26	5		1					12							2	
" 25.....	15 Swiss Cities.....	455,537	163	18.6		10		22		12	3		3					11								

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending November 8, 1884, in 29 cities of the United States, having an aggregate population of 6,666,300, there were reported 2,719 deaths, which is equivalent to an annual death-rate of 21.2 per 1,000. The rate in the North Atlantic cities was 21.2, in the Eastern 22.1, in the Lake 16.8, in the River 19.5, and in the Southern cities among the whites 24.0, and among the colored 37.0 per 1,000.

Accidents caused 3.4, consumption 13.3, croup 4.2, diarrhoeal diseases 4.3, diphtheria 7.0, typhoid fever 3.6, malarial fevers 1.3, scarlet fever 1.3, pneumonia 7.2, bronchitis 3.0, measles 1.1, puerperal diseases 0.9, and whooping-cough 0.4 per cent. of all deaths. Diphtheria shows a large mortality; for the corresponding week last year it caused 4.9 per cent. of the deaths; for this week it caused 6.1 in the North Atlantic cities, 6.3 in the Eastern, 11.5 in the Lake, 9.3 in the River, and 5.3 among the whites in the Southern cities. To croup is attributed 5.5 per cent. of the deaths in the Eastern cities, and 5.3 in the Lake cities. The greatest mortality from typhoid fever was in the River cities, having caused there 5.1 per cent. of the deaths, in the North Atlantic cities 4.7, and the Lake cities 4.0 per cent. Deaths from small-pox were reported in Chicago.

BOSTON, MASS.—C. E. Davis, Jr., reports 35 new cases of diphtheria, 30 of typhoid fever, and 48 of scarlet fever.

DETROIT, MICH.—Dr. O. W. Wight reports 2 new cases of scarlet fever and 40 of diphtheria.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 5 cases of diphtheria and 24 of scarlet fever under treatment November 8.

BALTIMORE, MD.—The report of the Board of Health for the week ending November 8 records 148 deaths, of which 38 were children under 5 years of age. The annual death-rate was 18.81 per 1,000 for the whole population, or 16.99 for the whites and 29.46 for the colored. Diphtheria caused 4 deaths, croup 5, typhoid fever 5, malarial fevers 5, diarrhoeal diseases 13, consumption 29, acute lung diseases 14, and violence 3.

MASSACHUSETTS.—During the week ending November 1, in 93 cities and towns of the State, having an aggregate population of 1,167,683, there were 398 deaths, which is equivalent to an annual death-rate of 17.72 per 1,000, against 17.70 for the previous week. The highest rates recorded were 25.6 in Fall River and 24.6 in Boston. The principal infectious diseases caused 101 deaths, among which were, diphtheria and croup 32, diarrhoeal diseases 27, typhoid fever 14, scarlet fever 10, measles 3, and whooping-cough 5. To consumption were attributed 70 deaths, and to lung diseases 40.

ST. LOUIS, MO.—The report of the Commissioner of Health for the month of October gives 685 deaths, which is 12 more than in the previous month, and 2 less than in the corresponding month last year. The annual death-rate for the whole population was 20.5 per 1,000. Scarlet fever caused 10 deaths, diphtheria 54, croup 13, typhoid fever 28, malarial fevers, 31, diarrhoeal diseases

75, consumption 61, acute lung diseases 49, and violence 30.

NEW HAVEN, CONN.—The report of the Board of Health for the month of October records 108 deaths, which exceeds the average of the corresponding month for the past five years by 23. The annual death-rate was 17.3 per 1,000. Diphtheria and croup caused 10 deaths, whooping-cough 2, malarial fever 1, typhoid fever 8, diarrhoeal diseases 9, consumption 17, acute lung diseases 8, and violence 2.

ENGLAND.—The return of the Registrar-General for the week ending October 25 gives the annual death-rate in the 28 large cities of England and Wales as 20.9 per 1,000. The highest rate, 31.5,

BELGIUM—Brussels.—October 12-18: Deaths, 173; annual death-rate, 22.0 per 1,000. Measles caused 1 death, scarlet fever 2, typhoid fever 6, croup 7, diarrhoea 23, acute lung diseases 23, consumption 29, and violence 7.

RUSSIA—St. Petersburg.—October 5-11: Deaths, 354; death-rate, 20.1 per 1,000. Small-pox caused 2 deaths, measles 2, scarlet fever 1, typhoid fever 9, diphtheria 6, whooping-cough 2, diarrhoeal diseases 67, and acute lung diseases 39.

DENMARK—Copenhagen.—October 15-21: Deaths, 112; annual death-rate, 21.8 per 1,000. Measles caused 7 deaths, scarlet fever 1, diphtheria 3, croup 2, whooping-cough 2, typhoid fever 1, diarrhoea 5, consumption 19, and violence 3. During the week 264 new cases of measles were reported, 21 of scarlet fever, 18 of diphtheria, and 18 of typhoid fever.

Association News.

A SANITARY CONVENTION will be held at East Saginaw, Mich., on Tuesday and Wednesday, December 2 and 3, under the auspices of the State Board of Health. The objects of the convention are stated to be the presentation of facts, the comparison of views, and the discussion of methods relating to the prevention of sickness and death, together with the improvement of the condition of the living. An invitation is extended to health officers to be present and take part in the discussion.

PHILADELPHIA MASTER PLUMBERS.—The Association held its regular monthly meeting on November 13, in the rooms of the association, 141 North Seventh Street, Mr. John J. Weaver, the President, in the chair, and Mr. Enoch Remick secretary. The minutes of the last meeting having been read and approved, a number of the regular expenses bills were presented and approved. Two new members were proposed for admission into the association, and their names were laid over, according to the rules, until the next meeting. Mr. Coffin called up the question of eligibility to membership of a manager of a plumber's shop, and a lengthy and spirited discussion was at once raised, the members discussing the subject pro and con for some time.

At length the president ruled the question out of order and irrelevant. Mr. Coffin differed with the presiding officer, and appealed from the ruling of the chair, but withdrew his appeal before a vote was taken. A discussion was raised on the merits and demerits of the new corporation ferrules, and the members gave their experience in their use, and the trouble arising to the plumbers from the new rules of the Survey Department, which prohibits the plumbers from drilling under the car-tracks, and which compels them to dig on both sides, where they were formerly permitted to drill under the car-tracks direct, was also discussed by the members, and on the motion of Mr. McCoach, the president was directed to visit the Chief Engineer of the Survey Department, and see if arrangements could not be made to obviate the trouble. The president made a few remarks in reference to the trade-school matters, and the members were requested to give their views on the school business. After a short discussion the association adjourned. The meeting was one of the most interesting ever held by the association.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
November 15.	23.16	18.66	22.55	29.35	27.87	19.98

E. G. LOVE, Ph.D., Gas Examiner.

MR. T. A. EDISON has obtained permission to put his lamps in the palace and grounds at Seoul, Corea.

THE total make of gas by the Carlisle, Eng., Corporation Works, for the year ending June 30 last, was 164,618,100 cubic feet, an increase of 2.5 per cent. over the preceding year. The leakage was 5.02 per cent., and about \$29,000 was realized from residuals, including 169 tons of sulphate of ammonia.

AT a meeting of the Board of Aldermen of Boston, Mass., last Monday, by a vote of 7 to 3, the Consumers' Gas Company was given the

right to lay pipes in the streets of the city. The order provides that in the year 1915 the city may purchase the plant of the company by paying the cost of it and interest at 6 per cent.

THE Baxter Telephone Company has been granted the privilege of laying an underground wire through certain streets of Philadelphia. It will use the Waring underground cables, which is somewhat in the shape of a five-leaf clover, and is of solid lead an inch in diameter, and has six copper insulated wires running through it.

THE accounts of the Glasgow Gas Committee for the year ending May 31, 1884, show a profit of about \$575,000. Over \$300,000 was realized from residual products, over two-thirds of this amount being received from the sales of tar and ammoniacal liquor. The total quantity of gas sold was 2,051,219,000 cubic feet, being an increase of 5.73 per cent. over the previous year. The leakage was 11.76 per cent.

THE Forest City Lighting and Heating Co., of Cleveland, O., with a capital of \$1,000,000, half held in Cleveland and half by the United Gas-Improvement Co., of Philadelphia, is taking steps to begin supplying gas. An endeavor will be made to have the City Council pass a resolution providing for a special election on the question whether or no the city shall grant to the company the right to establish and maintain gas-works, and use the streets for that purpose.

Notes.

CONSTRUCTION.

NEW YORK AQUEDUCT BIDS.—At a meeting of the Aqueduct Commissioners, November 13, all bids on sections A and B, as published in our issue of November 6, were rejected, and the secretary was ordered to readvertise for these sections. He will also advertise for proposals for the remaining sections, all to be opened December 8.

NEW YORK.—W. Wheeler Smith has been selected as the architect of the new building of the College of Physicians and Surgeons.

WATERBURY, CONN.—In our issue of November 6 we noted that the bid of Edward McManus for constructing sewers in Walnut, Coe, West Porter, and Scoville Streets had been rejected by the Common Council as informal. At a meeting of both branches of the city legislature, November 10, the Aldermen consented to awarding the contract to P. F. Brennan, the next lowest bidder.

PHILADELPHIA, PA.—The Gas Trust opened proposals for a new steel locomotive-boiler for the Twenty-sixth Ward Works, and the contract was awarded to Sidebotham & Powell for \$850, the other bidder being George W. Kraft at \$900.

CHARLESTON, S. C.—The City Council, November 11, voted to extend the time in which the Charleston Water Company must lay thirty miles of pipe five years. The company's petition states that sufficient water cannot now be obtained to fill that extent of mains.

AVONDALE, O.—The following bids for lateral sewers on Rockdale, Forest, and Ghalson Avenues were received by W. Elwood Wynne, Corporation Clerk, November 4: Barton & Stokes, \$8,280.90; Jonte & Barton, \$9,633.80; John Scully & Co., \$9,341.68. Contract awarded to Barton & Stokes.

BRENNHAM, TEXAS.—The Brenham, Texas, Water-Works Company has been organized to construct water-works.

NEW YORK—NEW ARMORY PLANS.—General Shaler, from the Armory Committee, submitted to the Sinking Fund Commission, November 13, plans for the new armory of the Twelfth Regiment, which is estimated to cost \$300,000. The matter was referred to the Controller to examine and report upon.

BROOKLYN, N. Y.—Bids were opened, November 8, by the Department of City Works, for constructing sewers in map O, District No. 37, subdivision No. 20, as follows: Joseph York, 18-inch pipe-sewer, \$1.60 per running foot; 15-inch pipe-sewer, \$1.40 per running foot; 12-inch pipe-sewer, \$1.07 per running foot; manholes complete with head and cover, \$37 each; street-basins complete, with iron pan, \$105 each. John Bogert & Co. \$1.50; \$1.35; \$1.13; \$34; \$95. John H. O'Rourke:

\$1.70; \$1.40; \$1.15; \$40; \$110. James F. Gillen: \$2.10; \$1.77; \$1.25; \$40; \$100. Thomas Newman: \$1.70; \$1.35; \$1.13; \$37; \$100. George F. Swift: \$1.65; \$1.40; \$1.15; \$37; \$115.

Also for a sewer in Dikeman Street: from John S. Bogert & Co., 12-inch pipe-sewer, \$1.30 per running foot; manholes, complete with iron head and cover, \$34 each. George F. Swift: 12-inch pipe-sewer, \$1.15 per lineal foot; manholes, \$37 each; street-basins, \$115 each.

On the 7th inst. bids were opened as follows for constructing sewers in Eldert and Margaretta Streets: George F. Swift, 30-inch brick sewer, \$4.24 per lineal foot; 18-inch pipe-sewer, \$1.65 per lineal foot; 15-inch pipe-sewer, \$1.38 per lineal foot; 12-inch pipe-sewer, \$1.10 per lineal foot; manholes, \$36 each; street-basins, \$110 each. James F. Gillen: 30-inch, \$4.10; 15-inch, \$1.95; 12-inch, \$1.50; manholes, \$40. John S. Bogert & Co.: \$4.50; \$1.60; \$1.25; \$37. Thomas Newman: \$4.35; \$1.40; \$1.25; \$40. Joseph York: \$3.25; \$1.50; \$1.18; \$37.

ST. PAUL, MINN.—The Water-Board Committee on Construction has presented a report on the strengthening of the roof of the east side pumping-station, with the engineer's estimate and plans. These state that it will require about 35,000 pounds of iron, and to place new intermediate trusses will require about 38,000 pounds. The cost of repairing per pound will be slightly in excess of the new work, so that the cost will be about the same in either case—viz.: 38,000 at 6½ cents per pound will amount to \$2,470.

City Engineer Summers submitted a report to the Committee on Streets November 11, upon the construction of a bridge across the Mississippi at Robert Street. His plan proposes a bridge capable of carrying a double line of car-tracks, leaving a clear roadway for two teams, and sidewalks ten feet wide at each side. The Committee on Streets passed a resolution approving the plan, and authorizing the City Engineer to prepare proposals and specifications.

DETROIT, MICH.—The Board of Estimate voted \$15,000 last spring for the construction of a bridge over the Michigan Central Railroad tracks over Marquette Street, the railroad to erect abutments and grade approaches. The bridge has not been built, and now Alderman O'Reilly will introduce a resolution requiring construction to be begun at once.

WASHINGTON, D. C.—Major Lydecker reports on the progress of the water-works extension during October that the work on all the shafts of the tunnel advances satisfactorily. The total length of the tunnel excavated at the end of the month was 5,598 feet, leaving 15,147 feet 10 inches yet to be driven. The work will be continued during November. On the reservoir the contractors accomplished 44,516 cubic yards excavation, 5,296 cubic yards puddling, 26 cubic yards brick masonry, 211 cubic yards concrete masonry, 69 square yards trap-rock lining, 190 cubic yards broken-stone lining, and 2,157 square yards paving.

THE FIRM known as Henry R. Worthington, of New York City, has made arrangements for opening a branch house in London. The pumps are to be made at the company's works in Brooklyn, and London used as a point of sale and distribution in England, on the Continent, and among the Colonies.

PROVIDENCE, R. I.—In his report to the City Council, containing the results of his observations on European sewerage systems, City Engineer Gray recommends for Providence as follows: "As the result of my investigations and study of this question I recommend: First, that intercepting sewers be built; second, that the sewerage of this city be conveyed to Field's Point; third, that it be treated there by chemicals in such a manner as to precipitate the matters in suspension and to clarify the sewage; fourth, that the clarified effluent be emptied into deep water at Field's Point."

LYNN, MASS.—The Committee on Drainage has received, and it is said, will recommend for adoption, the report for a sewerage scheme, prepared by Rudolph Hering, C. E., of Philadelphia. The estimated cost of the scheme is \$250,000. Pumping is contemplated for only one section of the system.

TOLEDO, O.—Mr. J. D. Cook, the hydraulic engineer, and Mr. Harry Cotter, Superintendent of the Water Works, leave this week on a tour of inspection of the water-works at Akron and other points in Ohio, including Ravenna, where the building of water-works is contemplated. Improvements will be made in the Toledo water-works. Two Worthington engines are used and a third is proposed.

CLEVELAND, O.—The contract for the iron superstructure of the Kingsbury Run Viaduct has been awarded by Council resolution to the King Bridge Iron and Manufacturing Company, of this city, for \$71,695. The bid of J. W. Walker, of Pittsburg, was \$895 lower, but the cost of inspection of material at Pittsburg would have increased it by \$1,500. For that reason the King Company's bid was accepted. The list of bids for this matter was published in our issue of October 30.

CINCINNATI, O.—The following bids for five steel boilers for the Front Street Pumping-Works were received by the Board of Public Works, November 3: Tudor Boiler Manufacturing Company, Cincinnati, O., 5½¢ per pound; C. T. Dumont, Cincinnati, O., 5½¢ per pound. Bid of Tudor Boiler Manufacturing Company accepted.

SAVANNAH, GEO.—The City Council has obtained from a New York City chemist an estimate of the cost of analysis of water in the city wells. This is in accordance with a recent resolution of the Council looking to the wells as a source of supply.

LEVEES.—Some \$63,000 has been subscribed toward building the Opossum Fork levee from Arkansas City to Amos Bayou Hills. This includes the \$25,000 appropriated by the River Commission. This is said to be sufficient for the work.—*Memphis Appeal*, November 4.

CHARLESTON, S. C.—The Keystone Bridge Company, of Pittsburg, Pa., will construct the iron bridge across the Ashley River. The owner is the Charleston Bridge Company.

GOVERNMENT WORK.

NEW YORK CITY.—The following bids for improving channel through Flushing Bay, N. Y., were received by Walter McFarland, Lieut.-Col. of Engineers, November 12, amount 20,000 cubic yards: P. Sandford Ross, Jersey City, 20½ cents per cubic yard; Richard Parrott, Newburg, N. Y., 24 cents; Atlantic Dredging Co., Brooklyn, N. Y., 19 cents; Thomas H. Benton, Elizabeth, N. J., 38 cents; Morris & Cummings Dredge Co., New York City, 38 cents; Elijah Brainard, New York City, 36 cents; Henry E. Du Bois' Sons, New York City, 17½ cents.

NEW YORK CITY.—The following bids for improving Newtown Creek, N. Y., were received by Walter McFarland, Lieut.-Col. of Engineers, November 12, amount 40,000 cubic yards: Atlantic Dredging Co., Brooklyn, 23½ cents per cubic yard; Thomas H. Benton, Elizabeth, N. J., 28 cents; Elijah Brainard, New York, 23½ cents; Morris & Cummings Dredge Co., New York, 42 cents; Frank Pidgeon, New York, 27½ cents; Henry E. Du Bois' Sons, 29¾ cents.

JACKSON, MISS.—The following is a synopsis of bids for joiner's work and wood flooring in the court-house and post-office, opened in the office of the Supervising Architect, November 11: Robert Mitchell Furniture Co., Cincinnati, O., 1. \$11,320; 2. \$10,990; Tomlinson & Carsley, Cincinnati, \$11,500, \$9,500; Smith, Sargent & Co., Topeka, Kan., \$11,931, \$10,231; Joseph Thomas & Son, Baltimore, Md., \$16,449, \$12,300. No award has been made.

LONG LAKE LEVEE, ARK.—Bids for work on the levee were opened November 5, as follows: Joseph C. Neely, Bardwell, Ky., Long Lake enlargement, 30c. per cubic yard, filling gap, etc., 24¾¢. per cubic yard; George Arnold, Memphis, Tenn., Long Lake enlargement, 26¾¢; filling gap, etc., 23¾¢; Winters & Cooney, Memphis, Long Lake enlargement, 25c.; filling gap, etc., 23c. Contract awarded to Winters & Cooney.

CINCINNATI, O.—The following is a synopsis of bids for painting, bronzing, and polishing in the custom-house and post-office, opened in the office of the Supervising Architect, November 8: William Phillipson, Cincinnati, \$19,000, bid informal—telegraphic; Samuel Dickson, Cincinnati, \$3,587; Robert Mitchell Furniture Co., Cincinnati, \$19,909; John W. Carr, Washington, D. C., \$11,400. No award has been made.

U. S. ORDINANCE DEPARTMENT.—The bid of the West Point Foundry Association for Hotchkiss banded-cored shot has been accepted. The bid is as follows: 500 8-inch Hotchkiss banded-cored shot at \$13.70 each, the tenacity of the metal to be not less than 25,000 pounds per square inch, and each projectile to weigh 180 pounds, and to be of good workmanship, and of the standard service dimension. This was the only bid received under the advertisement of October 28.

ST. LOUIS, MO.—Bids for ornamental panels to area-railings of the custom-house and post-office were opened in the office of the Supervising Architect, November 8, as follows: Stupp Bros., St. Louis, Mo., \$584; Scherpe & Koken, St. Louis, \$580; Aetna Iron-Works, Dayton, O., \$597; Christopher & Simpson, St. Louis, \$868; Schickle, Harrison & Howard Iron Co., St. Louis, \$700. Contract awarded to Scherpe & Koken.

BUFFALO, N. Y.—The following bids for dredging in the West Channel and repairing East Breakwater, Dunkirk Harbor, were received by Capt. Edward Maguire, U. S. A., November 15: Edward J. Hingston, Arthur Woods, Buffalo, N. Y., white oak, per 1,000 feet B. M., \$40; drift-bolts, per pound, 6c.; dredging per yard, 18c.; removing old work, per 1,000 feet B. M., \$10; galvanized-iron per linear foot, 96c.; total, \$8,202. Louis P. Smith, James A. Smith, Cleveland, O.; \$40; 5c.; 30c.; \$7; \$1; \$12,533.

MEMPHIS, TENN.—The following bid for repairs of levees at Arkansas City to Amos Ridge, Ark., was received by Capt. Clinton B. Sears, U. S. Engineers, November 8, amount 325,000 cubic yards: Tennessee Industrial Company, John D. Adams, President, Memphis, Tenn., 24c. per cubic yard; engineering expenses and inspection, \$1,200; total, \$79,200. This was the only bid received.

SAN ANTONIO, TEX.—The contract for constructing 17 brick buildings at Camp Rice, opened by J. G. C. Lee, Major and Quartermaster, U. S. A., November 11, has been awarded to M. S. Pleasants, of San Antonio, for \$47,029.

CUSTOM-HOUSE AND POST-OFFICE, KANSAS CITY, MO.—Synopsis of bids for joiner's work and wood flooring, opened October 15, 1884:

WOOD FLOORING.		Time.	1 mo.	60 days.	5 mos.	3 mos.	.....
Per Square 100 Feet for Additional Flooring.	Amount.	Time to Complete.	6 months.	6 months.	5 months.	5 months.	7 months.
Bird's-Eye Maple.	\$3 25	6 00	1 00	1 00	1 00	1 00	1 00
Cherry.	\$2 75	5 50	1 00	1 00	1 00	1 00	1 00
Ash.	\$2 25	5 00	84	3 20	2 00	2 00	2 00
White Oak.	\$2 25	5 00	84	3 25	2 00	2 00	2 00
White Pine and Bird's-Eye Maple.	\$35,456 00	39,000 00	22,722 00	.....	.....	.....	.....
White Pine and Cherry.	\$33,456 00	35,900 00	21,222 00	24,207 00	23,203 00	.....	.....
White Pine and Ash.	\$31,456 00	33,900 00	19,022 00	23,100 00	22,238 00	.....	.....
White Pine and White Oak.	\$31,456 00	33,900 00	19,022 00	23,200 00	22,238 00	.....	.....
Street & Chambers.	.....	.....	.....	.....	.....	.....	.....
W. B. Everhart.	.....	.....	.....	.....	.....	.....	.....
Smith, Sargent & Co.	.....	.....	.....	.....	.....	.....	.....
Robert Mitchell Fur Co.	.....	.....	.....	.....	.....	.....	.....
Joseph Thomas & Son	.....	.....	.....	.....	.....	.....	.....

PHILADELPHIA, PA.—The following bids for 23,000 tons of stone, more or less, for the Delaware Breakwater were received by Major W. H. Heuer, U. S. A., November 15:

NAME.	Amount bid for tons.	Price per ton.
Charles H. Edwards, Quincy, Mass.	10,000	\$3 18
Mt. Waldo Granite-Works, Frankford, Me.	13,000	3 78
William H. Browne, Brooklyn, N. Y.	10,000	4 47
James Symington, New York	5,000	4 97
John S. Howell, New York	8,000	5 47
H. Opperman & J. J. Shoemaker, Harrisburg, Pa.	23,000	5 74
John A. Bouker, Jersey City, N. J.	23,000	5 74
Charles A. Brown, Elizabeth, N. J.	23,000	5 74
Smith & Ward, Philadelphia, Pa.	23,000	5 74
Andrews & Lock, Baltimore, Md.	23,000	5 74
Parker & Sylvester, Rockport, Mass.	23,000	5 74
Conshohocken Stone-Quarry Co., Philadelphia, Pa.	23,000	5 74
William C. Watson, Stamford, Conn.	23,000	5 74
George G. Leiper, Chester, Pa.	23,000	5 74
McClennahan Bros., Port Deposit, Md.	23,000	5 74
James M. Andrews, Bellevue, Del.	23,000	5 74
George Willott Andrews, Biddeford, Me.	23,000	5 74

* For samples Nos. 3, 4, and 8.
* For samples Nos. 2, 5, and 7.

HARPER LEVEE, in Tensas Parish, La., under construction by the State, has been completed. It contains 142,456 cubic yards of earth-work and cost the State \$40,725. It was let out under contract in 1883 to John B. Reid, but before it could be finished the high water came and stopped all work on it. It was subsequently taken up by the contractor and has been successfully finished.

ANOTHER PLUMBERS' PAPER.

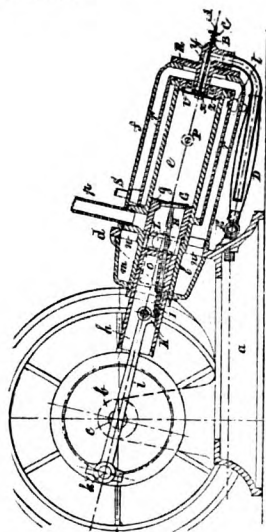
We have received the first copy of the *Scientific Plumber*, to be published on the 1st and 15th of each month, under the editorial management of Mr. William I. Taffe, recently the editor of the *Hydraulic and Sanitary Plumber*.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented.

Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

800,453. GAS-ENGINE. Edmund Edwards, 40 Southampton Buildings, county of Middlesex, Eng. Filed October 11, 1883. (No model.) Issued June 17, 1884. Patented in England February 20, 1880, No. 766, and April 23, 1881, No. 1,765; in France August 10, 1880, No. 138,326; in Belgium August 20, 1880, No. 52,371, and in Germany August 25, 1880, No. 14,262.

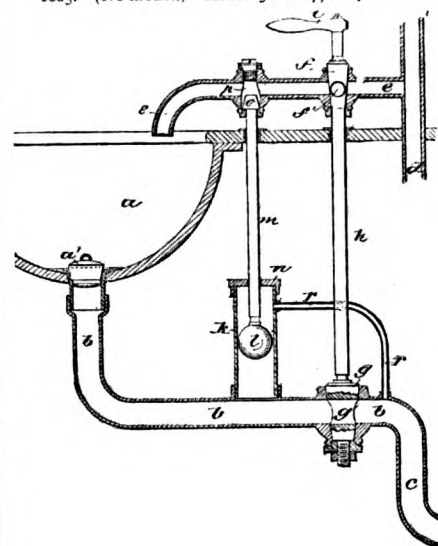


Claim.—1. In a gas-engine, the combination, with the piston *g*, of the exhaust-valve *G*, tail-piece *K* on the connecting-rod *i*, and the hollow trunk *A*, having holes *L*, substantially as set forth and shown.

2. In a gas-engine, the combination, with the engine-cylinder, of the outer casing, *f*, its cover *R*, air-casing *m*, and the plate *d*, having openings *n*, substantially as set forth and shown.

3. In a gas-engine, the combination of the engine-cylinder, the outer casing *f*, the cover *R*, and the openings *n*, with the openings *o* in the guide *l*, and the air-casing *m*, substantially as set forth and shown.

800,589. COMPOUND AND SELF-ACTING PLUG-VALVE FOR WASH-BASINS. Thomas P. Ford, Jr., Brooklyn, N. Y. Filed December 18, 1883. (No model.) Issued June 17, 1884.



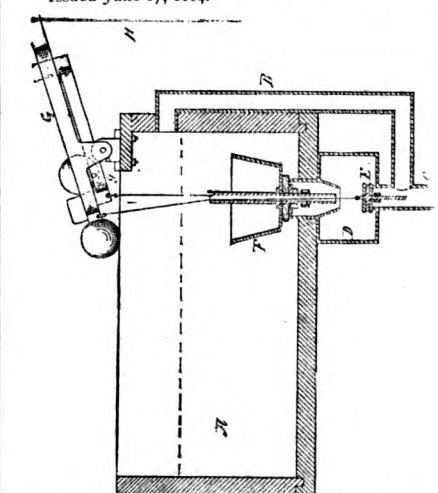
Claim.—1. A valve system for liquid pipe-connections to basins or other vessels, consisting of rigidly-connected valves *f*, *g*, working in the supply and discharge pipes *e*, *b*, respectively, and arranged to simultaneously close the inlet and open the discharge, or vice versa, and a self-acting float-valve, *o*, adapted to seat itself by liquid-pressure, and fitted in the pipe *e* between the valve *f* and the inlet discharge-nozzle, substantially as shown and described.

2. The combination, with the supply and discharge pipes *e*, *b*, of the valves *f*, *g*, apertured at *f'*, *g'* at right angles with each other, the float-chamber *k*, and the float-valve *l*, *m*, said float-chamber and float *l* and the valve *g* being located in front of the trap *c*, to be sealed thereby, substantially as shown and described.

3. The combination, with the pipe *b*, its float-chamber *k*, and float *l*, of the relief-pipe *r*, substantially as shown and described.

4. The combination, with the pipe *b* and the float-chamber *k* and float *l*, of the relief-pipe *r*, discharging into pipe *b* in front of the trap *c*, to be sealed by the trap, substantially as shown and described.

800,540. SUPPLY-VALVE FOR WATER-CLOSETS, &c. Henry Cory Weeden, Boston, Mass. Filed November 22, 1883. (No model.) Issued June 17, 1884.



Claim.—1. In a flushing apparatus for water-closets and kindred structures, the improved compound or double lever herein described, consisting of two counterbalanced lever parts, one of said parts being provided with a suitable stop adapted to check the fall of the other at a given point, substantially as and for the purposes herein described.

2. In a flushing apparatus for water-tanks, the combination of a two-part or double lever with a water-detaining pan, an independently-movable valve for regulating the outflow of water from the tank and chamber *D*, and means, substantially as described, for holding said valve away from its seats during a predetermined flushing period, all substantially as herein described and shown.

3. The combination, with a double or compound flushing-lever, of a water-detaining cup carrying a valve for opening and closing the flow of water from a chamber, *D*, the said cup being connected to both parts of the compound lever with connections of variable lengths, all substantially as herein described and shown.

4. The combination, with the main flushing-tank, of a chamber, *D*, a valve for opening and closing the inlet to and exit from said chamber a water-retaining pan or cup, and means, substantially as described, whereby the said valve is automatically held, so as to keep open both the entrance to and exit from the chamber during the flowing out of a predetermined quantity of water from the main tank, and no longer.

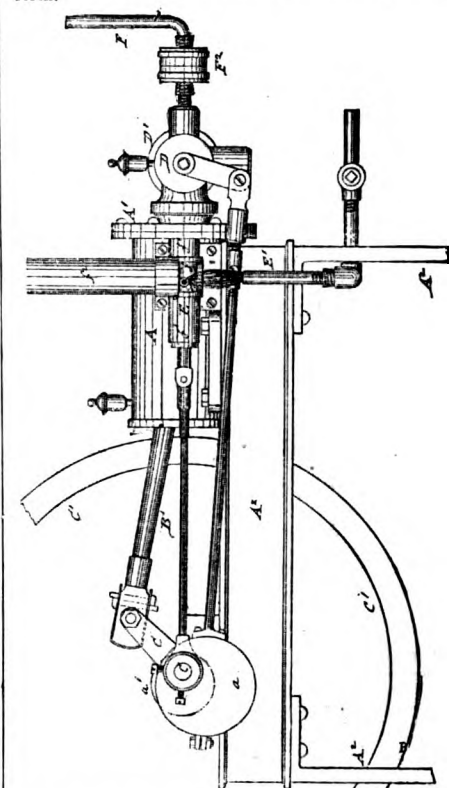
5. The combination, with a valve for opening and closing the inlet and outlet of a chamber, *D*, of the character herein described, of a water-detaining pan or cup provided with a passage-way extending through said cup and above the height of its rim, and of suitable connections for raising and suspending the said cup and the said valve independently, all substantially as and for the purposes herein set forth.

800,294. GAS-ENGINE. Joseph S. Wood, Brooklyn, N. Y. Filed February 28, 1884. (No model.) Issued June 10, 1884.

Claim.—1. In a gas-engine, the combination of a cylinder, a reciprocating piston, a crank-shaft, an igniter arranged at one side of the cylinder, means for reciprocating the igniter-valve, a gas-and-air-supply valve communicating with the cylinder, a valve-gear for oscillating the piston-valve, said valve communicating

with the gas-supply pipe, air-pipe, and the cylinder, substantially as set forth.

2. In a gas-engine, the combination of a cylinder, *A*, having an inlet-port, *a*, a gas-and-air-supply valve, *D*, having gas and air channels *d*, *d'*, a valve-gear for oscillating said valve, a valve-casing, *D'*, having ports *e*, *e'*, and a gas-supply pipe, *F*, having a check-valve, *F'*, the oscillating gas-and-air valve serving also to exhaust the products of combustion, substantially as set forth.



3. In a gas-engine, the combination, with the cylinder, of an auxiliary supply-tube composed of a supply-valve having a perforated bottom, a vertically-adjustable spindle, and a weighted valve, substantially as set forth.

ANNOUNCEMENT.

The publication of the sixth revised edition of the U. S. Pharmacopœia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopœia the official standard.

In accordance with our established policy we shall, as in the past, use our best endeavors to furnish only such preparations as shall meet pharmacopœial requirements.

We are heartily in sympathy with all efforts which aim to improve the quality of medicines, and shall continue as heretofore to exclude all low grade and inferior articles and to use our influence to promote the sale and use of pure drugs and medical preparations.

W. H. SCHIEFFELIN & CO.
New York:
175 WILLIAM STREET.

OFFICE OF The Consolidated Gas Co. of New York.

No. 4 IRVING PLACE,
NEW YORK, November 11, 1884.

TO THE CONSUMERS OF GAS.

On and after this date the price of gas supplied by this company will be as follows:

To all consumers of less than one hundred thousand cubic feet per month, \$1.75 per thousand feet.
To all consuming one hundred thousand cubic feet and over per month, \$1.50 per thousand feet.

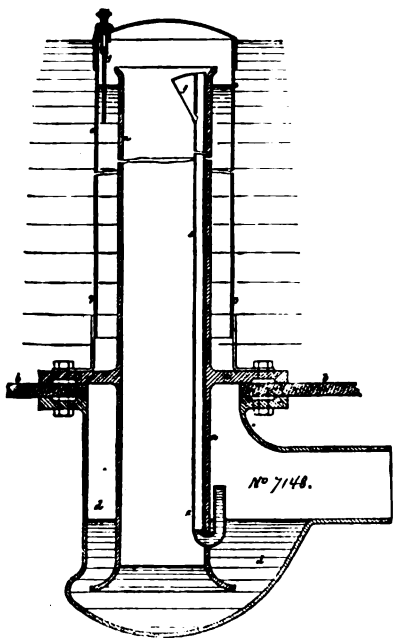
CHARLES ROOME, President.
H. E. GAWTRY, Secretary.

Index to European Advertisements.

ANDERSON, ROBERT, & Co., Liverpool, Eng. Sanitary Specialties. P. 589.
CRAIG, J. & M., Kilmarnock (near Glasgow), Scotland. Fire-Clay Sinks. P. 589.
DOULTON & Co., London, Eng. Sanitary Specialties. P. 589.
HARTSHILL BRICK AND TILE CO., Stokes-on-Trent, Eng. Tiles. P. 589.
HOUGHTON & Co., London, Eng. Sanitary Specialties. P. 589.
HYGIENIC AND SANITARY ENGINEERING CO. (LIM.), London, Eng. Sanitary Specialties. P. 589.
JOHNS, EDWARD, Rugeley, Eng. Plumbers' Earthenware. P. 589.
KEITH, JAS., London, Eng., and Edinburgh, Scotland. Heating and Ventilating. P. 589.
KING, P. S., & SON, London, Eng. Publishers and Booksellers. P. 588.
POPPLEWELL, COLTON & Co., London, Eng. Patent Agents and Consulting Engineers. P. 589.
SMALPAGE & SON, London, Eng. Tailors. P. 588.
THE LANGHAM HOTEL, London, Eng. P. 588.
THE NORTH BRITISH RUBBER CO. (LIM.), Edinburgh, Scotland. Rubber for Sanitary Purposes. P. 588.
WOODWARD, JAS. SWADLOW, near Burton-on-Trent, England. Sanitary Specialties. P. 588.

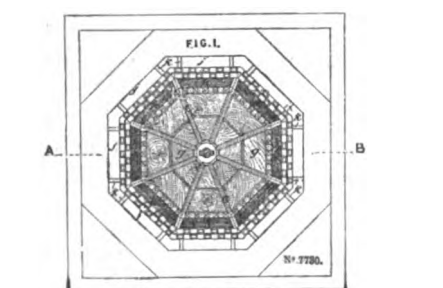
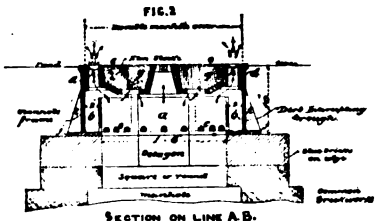
English Patents.

7,148. AN IMPROVED APPARATUS FOR THE INTERMITTENT DELIVERY OF WATER FROM FLUSHING-TANKS, AND FOR LIKE USES, and in what manner the same is to be performed.



This invention has for its object an improved apparatus for the intermittent delivery of water from flushing-tanks, and for like uses.
William Bartholomew, of Messrs. Doulton & Co.'s Sanitary Engineering Works, Albert Embankment, Lambeth, in the county of Surrey, sanitary engineer.
Complete specification May 2, 1884. (Price 4d.)

7,780. AN IMPROVED COMBINED SEWER-VENTILATOR AND MANHOLE-COVER WITH DIRT-INTERCEPTING TROUGH.



The apparatus is of cast-iron, of an octagonal figure in plan, and the section of the body of the apparatus in the form of a trough with vertical sides; the said trough is continuous on all sides of the octagonal figure, and is wholly formed of cast-iron, thus being complete in itself without the necessity for a stone seat or other false bottom.

The bottom of the said dirt-trough is furnished with a flange projecting beyond its outer side, so as to give a wider base for the support of the apparatus on the brick walls of the manhole of the sewer.
Alfred Barton Brady, of 16 Spital Road, Maldon, in the county of Essex, civil engineer.
Prov. spec. (Price 6d.)

Building Intelligence.

WE solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s.*, brown stone; *br.*, brick; *br st.*, brick store; *bs dwl.*, brown-stone dwelling; *apart house*, apartment-house; *ten.*, tenements; *ca.*, each; *o.*, owner; *a.*, architect; *b.*, builder; *fr.*, frame.

NEW YORK CITY.

47 Oak st., 4-story br ten; cost, \$12,000; o, Sarah Welsh; a, Emile Gruwe.
63 and 65 Sheriff st., 2 5-story br tens; cost ea, \$18,000; o and a, Anthony A. Hughes.
Old slip, bet Front and Water sts., 2-story and attic br and st bldg; for Hook and Ladder Co.; cost, \$—; o, New York City Fire Dept.; a, Le Brun & Son.
85 Broome st., 5-story br st; cost, \$15,000; o, Patrick Skelly; a, John B. Snook.
33½ Stanton st., 5-story br ten; cost, \$17,000; o, Johanna Noelke; a, William Graul.
56th st., n s., 150 e 11th av., 3-story br storage bldg; cost, \$—; o, A. H. Hart Co.; a, A. Spence; b, John Van Dolan.
45th st., n s., 100 e 9th av., 5 5-story br tens; cost ea, \$18,000; o and b, William Rankin; a, M. Louis Unglich.

2d av., e s., 76th to 77th st., 8 5-story br st tens; cost, 2, ea, \$22,000; 6 ea, \$14,000; o, Higgins & Keating; a, A. B. Ogden & Son.
76th st., n s., 88 e 2d av., 5-story br st ten; cost, \$22,000; o and a, same as last.
77th st., s s., 88 e 2d av., 5-story br st ten; cost, \$18,000; o and a, same as last.
118th st., s s., 90 e 4th av., 2 5-story br tens; cost ea, \$20,000; o, Henry Chenoweth; a, John C. Burne.
78th st., s s., 250 w 1st av., 5-story br st flat; o, James Carroll; a, John F. Wilson.

BROOKLYN.

Madison st., n s., 224 e Reid av., 2 2-story and bmt br dwells; cost ea, \$4,000; o, G. De Revere; a, Amzi Hill.
Louis pl., w s., 144 s Herkimer st., 3 3-story br tens; cost ea, \$5,500; o, K. J. Peter; a, H. Thiele; b, Frank Metzler.
Decatur st., s s., 100 e Reid av., 3 2½-story and bmt br dwells; cost ea, \$4,200; o, William Simonson; superintendent, John Dhuy.
Stagg st., n s., 200 e Graham av.; 4 4-story br tens; cost for all, \$40,000; o, H. and H. Reiners; a, E. F. Gaylor; m, Matthew Smith.
Decatur st., s s., 310 w Lewis av., 2 2-story and bmt br dwells; cost, \$4,500; o, Nellie McLain; a and c, T. S. McLain; m, S. Ramsdel.
211 and 217 17th st., 2 2-story and bmt br st dwells; cost ea, \$4,000; o, Thomas Pitbladdo; a, B. S. Brown; b, Wm. & Thos. Corrigan.
North 2d st., s s., 75 w Graham av., 3-story fr ten; cost, \$5,000; o, John P. Conselyea; a, E. F. Gaylor; b, Jacob Shoch & Howard Boyce.
206-8 Hancock st., s s., 210 w Marcy av., 2 3-story and bmt br dwells; cost ea, \$10,000; o and b, George H. Stone; a, G. A. Schellenger.
Central av., e s., 40 n George st., 3 3-story fr tens; cost, \$13,800; o, Hubert Fischer; a, Fr. Holmberg.
St. Mark's av., s s., 220 e Kingston av., 3-story br dwell; cost, about \$40,000; o, Wm. Eggert; a, G. Damen; b, P. McGuinn.
South 4th st., n e cor 7th st., 2 4-story br stores and tens; cost ea, \$8,000; o, Fredk. Haack; a, E. F. Gaylor; b, Thos. Gibbons & Saml. Hough.
6th st., n s., 147 to 16 6th av., 6 2-story br dwells; cost, ea, \$4,000; o, a and c, Thos. Butler; m, Thos. Nash.

ALTERATIONS, NEW YORK.

499 5th av., 1-story br exten, also alterations; cost, \$15,000; o, Alex. A. Hume; a, Wm. H. Hume.
473 W. 73d st., internal alterations; cost, \$6,500; o, Dr. Charles F. Hoffman; a, John B. Snook.
Broadway, s w cor 41st st., alterations to skating rink; cost, \$6,000; lessees, Northcote & Adams; b, Joseph Coar.

BALTIMORE, MD.—Ramsay st., n s., 8 br bldgs; o, Chas. Wilkins.

McCullough st., 4 br bldgs; o and b, Wm. G. Scarlett.
Broadway, e s., 2 br bldgs; o, Mary M. Weeden.
McCullough st., w s., 2 br bldgs; o and b, Wm. H. Forrester.

Hanneman av., s s., 12 br bldgs; o and b, Aug. Hanneman.
Hanover st., e s., 6 br bldgs; o and b, Woelk & Pierson.

Bowers st., w s., 16 br bldgs; o and b, W. C. Yatesman.
McKim st., w s., 2 br bldgs; o and b, Thomas Grogan.

CHICAGO, ILL.—740-42 W Adams st., br dwell; cost, \$15,000; o, H. Valmer; a, A. Smith.
222-26 Van Buren st., br freight-house; cost, \$25,000; o, American Express Co.
3543-57 Cottage Grove av., br st and dwell; cost, \$30,000; o, Lazarus Silverman; a, Oscar Cobb; b, A. Langust.
214-20 Market st., 6-story br warehouse; cost, \$75,000; o, Mrs. C. McCormick; a, A. M. F. Colton; b, E. Farnshaw.

588-90 Blue Island av., br st and dwell; cost, \$12,000; o, Hy Rohn; a, C. O. Hansen.
70-72 Bellevue pl., br dwell; cost, \$15,000; o, a, and b, Greg. Vigeant.

F. R. Schock is architect for a \$6,000 building on Wabash av.

DETROIT, MICH.—Architect Carl Schmid is preparing plans for a \$7,000 dwelling for John Stricker.
72 Adams av., br dwell; cost, \$5,000; o and a, T. S. Reath; b, A. Albrecht.

739 Cass av., br dwell; cost, \$5,000; o, W. E. Briscoe; a, C. B. Cole; b, T. Fairbairn.

ENGLEWOOD, ILL.—Br st; cost, \$8,000; o, F. Malkow a, P. W. Ruehl; b, Lucht & Madden.

GALESBURG, ILL.—Addn to Knox College; cost, \$20,000; o, the college; a, J. C. Cochrane.

PHILADELPHIA, PA.—Front st., bet Cambria and Gurney, 2 3-story br dwells; b, F. N. Forsyth.

Baltimore av., bet 41st and 42d, stone Sunday-school bldg; b, W. S. Kimball.

Mifflin st., bet 6th and 7th, 5 2-story br dwells; o, Wm. Merrick.

Orkney st., n of York, 7 2-story br dwells; o, John Schieler.

Warnock st., bet Columbia av. and Oxford st., 5 br bldgs; b, James Hood.

Paethorp st., n of York, 4 2-story br dwells; b, F. Schonibig.

63½ st., n Callowhill, 2 br dwells; b, Lucien C. Smith.

62d st., n Hamilton st., 6 3-story br dwells; o, John H. McIlvain.

Mather st., bet Ontario and Tioga st., 2 br dwells; b, Joseph N. Patterson.

Reed st., bet 20th and 21st, 4 2-story br dwells; o, Wm. Blair.

Humboldt st., bet 10th and 11th, 3 2-story dwells; b, C. Wiley.
1321-23 Bruno st., 2 br dwells; b, Overheart & Ruten.
1322-4-6 Atmore st., 3 br dwells; b, same as last.

PINE LAKE, WIS.—Br greenhouse and graper; cost, \$15,000; o, J. A. Kirk; a, Edbrooke & Burnham.

READING, PA.—Clymer st., 3-story br dwell; cost, \$10,000; o, Friendship B. Assoc.; a, E. Mull; b, H. Pummel.

VALPARAISO, ILL.—Hard wood furniture for court-house; cost, \$10,000; o, county; a, J. C. Cochrane.

WASHINGTON, D. C.—Alley bet B & C sts and 1st and 2d, s w., 16 2-story br dwells; cost, \$8,000; o, a and b, Geo. H. Boston.

M st., bet 6th and 7th, 2 3-story br bldgs; cost, \$8,000; o, Thos. Kearney; a, J. Gurnuller.

18th and P sts., 4-story br bldg; cost, \$12,000; o, G. P. Van Wyck; a, Wm. Morrison.

31 permits for improvements less than \$5,000 in value since last report.

WINNETKA, ILL.—6 br cottages; cost, \$15,000; o, J. O. Smith; a, Edbrooke & Burnham.

Proposals.

PROPOSALS FOR STONE AND BRICK WORK, AT ROCHESTER, N. Y.

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 12, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 13th day of December, 1884, for furnishing and setting all the stone masonry and supplying and laying all the brick masonry required for the basement and superstructure of the Court-House, Post-Office, etc., building at Rochester, N. Y., in accordance with the drawings and specification for each class of work, copies of which may be seen and any additional information obtained on application at this office or the office of the superintendent, on and after November 20.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. F. BELL,
Supervising Architect.

PROPOSALS FOR BALCONIES.

OFFICE OF
SUPERVISING ENGINEER AND ARCHITECT,
New Pension Building,
WASHINGTON, D. C., November 11, 1884.

Proposals are invited for the decorative wrought-iron work of one or two bracket balconies, seventy feet by five feet, in the new Pension Building.

Drawings and specifications are to be obtained from this office. Proposals opened at noon of 3d December.

M. C. MEIGS,
Supervising Engineer and Architect.

PROPOSALS FOR STEAM-HEATING APPARATUS, AT MEMPHIS, TENN.

OFFICE OF THE SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 17, 1884.

Sealed proposals will be received at this office until 2 P. M. on the 8th day of December, 1884, for supplying and putting in place, complete, in the Marine Hospital buildings, at Memphis, Tenn., a low-pressure return-circulating steam-heating apparatus, in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.

Bids must be accompanied by a certified check, and those received after the time of opening will not be considered.

M. E. BELL,
Supervising Architect.

GREAT KANAWHA RIVER IMPROVEMENT. PROPOSALS FOR THE IRON-WORK IN THE FOUNDATIONS OF DAM NO. 6.

UNITED STATES ENGINEER OFFICE,
378 St. Paul Street,
BALTIMORE, MD., October 30, 1884.

Proposals for iron-work in the foundations of a Movable Dam, at Lock No. 6, on the Great Kanawha River, West Virginia, about four miles below Charleston, will be received at the U. S. Engineer Office, Charleston, Kanawha County, West Virginia, until noon of December 2, 1884, and opened immediately thereafter.

Blank forms, specifications, and any desired information can be had upon application to Mr. A. M. Scott, Assistant Engineer at that office.

WM. P. CRAIGHILL,
Lt.-Col. of Eng'rs, U. S. A.

Grading, curb-setting, and brick and pipe sewer construction in certain streets of New York City. Until November 25. Address THE COMMISSIONERS OF THE DEPARTMENT OF PUBLIC PARKS, of New York City.

Sinking artesian well, depth 2,000 feet; minimum diameter, 6 inches. Until December 15. Address ZIMMERMAN DAVIS, Secretary of the Charleston, S. C., Water Company.

Constructing ice-piers on the Great Kanawha River, near Point Pleasant, W. Va. Approximate quantities of material required: 204,472 feet B. M. oak timber, 9,536 pounds of iron drift-bolts, 2,486 cubic yards of rip-rap stone. Until December 8. Address Lieut.-Col. WILLIAM E. MERRILL, U. S. A., Engineer Office, Cincinnati, O.

(1) Driving piles and constructing jetties at Volusia Bar, Fla. (2) Making a cut through neck at Devil's Elbow, Upper St. John's River, Fla. Until November 24. Address Capt. WILLIAM T. ROSELL, U. S. A., Engineer Office, Jacksonville, Fla.

Belting, files, tool-steel, pine and bay-wood, stationery, etc., for the Bureau of Ordnance. Until November 22. Address THOMAS H. LOOKER, Pay Director, U. S. N., Navy Pay Office, Washington, D. C.

Materials and labor for brick school-house in sub-district No. 9, Madison township, O. Until November 22. Address A. M. SELTER, Township Clerk, Groveport, O.

Furnishing pine and hemlock timber for breakwater construction at Chicago, Ill. (about 2,167,000 feet B. M.) Until December 9. Address Maj. W. H. H. BENYAUUD, U. S. A., Engineer Office, 25 Honore Building, Chicago.

Construction of brick chimneys at Cape Henry, False Cape, Caffey's Inlet, Nag's Head, Chicomicomico, Dam Neck Mills, Whale's Head, Kitty Hawk, Oregon Inlet, Little Kinnakeet. Address Supt. SIXTH LIFE-SAVING DISTRICT, Manteo, N. C.

Dredging in (1) Wilmington Harbor and (2) Wicomico River, Md. Until November 27. Address WILLIAM F. SMITH, U. S. Agent, U. S. Engineer Office, Wilmington, Del.

Erection of brick court-house, stone facing, 40'x75', tower. Architect, J. F. Schneider, 933 F Street, N. W., Washington, D. C. Until November 24. Address L. S. WALKER, Clerk of Board of Supervisors of Shenandoah County, Woodstock, Va.

The municipality of the city of New Westminster are prepared to offer the sum of \$5,000 as a bonus to any person or company that will build, maintain, and run a railway from the city of New Westminster to the Canadian Pacific terminus at Port Moody. Said offers to be sent into this office on or before the last day of November, 1884. By order, A. J. ALFORD, C. M. C., City Clerk's Office, New Westminster, B. C.

Building iron screw-steamer for Light-House Board. Until December 1, 1884. Address S. C. ROWAN, Vice-Admiral, U. S. N., Chairman, Office of the Light-House Board, Washington, D. C.

Building new city-hall at Richmond, Va. Until December 1. Address W. E. CUTSHAW, City Engineer.

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ANNOUNCEMENT.

WITH the next issue THE SANITARY ENGINEER begins its eleventh volume.

It is proposed to furnish occasional supplements illustrating some notable buildings, the drawings being specially made by well-known artists for THE SANITARY ENGINEER. It is hoped this feature will increase the popular interest in the journal, and cause it to be more highly prized by the architects and architectural students among its readers.

It is believed that in the matter of illustrations of special interest to its various classes of technical readers, the coming volume will exceed in quantity and quality any that have preceded it.

The first of the illustrated supplements above referred to appears in this issue.

THE TENEMENT-HOUSE CIGAR LAW.

THE Tenement-House Cigar Law, passed at the last session of the Legislature, has been declared unconstitutional by the General Term of the Supreme Court in an opinion which will be of general interest. The law, as passed, was ostensibly in the interests of the public health, and prohibited the manufacture of cigars in tenement-houses of a certain kind, such as those occupied by more than three families living independently of each other and doing their cooking on the premises. An exception was made in the case of the first floor of a tenement-house, which had also a store for the sale of tobacco. Shortly after the passage of the bill Peter Jacobs, who carried on the manufacture of cigars in a tenement-house on the east side with his family, was arrested, in order to make a test case, and held in default of bail. A writ of *habeas corpus* was taken out in his favor and dismissed by the Special Term, and this decision has now been reversed by the General Term. The opinion is a vigorous one, and though apparently justified by the facts, it takes an unusual course in declaring that the object of the Legislature in passing the bill was not to protect the public health, but to prevent injurious competition with the large manufactories. The reasons for this view are stated to be apparent on the face of the bill. The bill in the first place does not apply to all tenement-houses, as would naturally be the case if the public health were the real object, but exempts those where the cooking is not done on the premises.

On this point it is said: "It is the swarming tenements, whose inhabitants live in promiscuous dependence without cooking in their tenements, but who live from hand to mouth in the streets and grog-shops, or as beggars, whose health most needs the protection of the police, but they are not included in the act. Again, a cigar or tobacco store on the first floor exempts that floor from the operation of the act. This fact, if health were the object, would require more stringency instead of relaxation in the law. A half-dozen families there carry on the manufacture of cigars or tobacco where they sleep and cook, while the head of the family would be a criminal for carrying on the manufacture on the floor above. The act is not a police regulation for health, because it fails in that object; on the contrary, it strikes with unjust and cruel severity a class of humble manufacturers too poor to live elsewhere than in crowded tenement-houses, unable to have a store on their premises or to rent a shop outside their residences."

It is also considered that the failure to include other large cities besides New York under the act is an indication that the public health was a minor consideration.

It is further stated that the act is unconstitutional, because it, in effect, deprives the laboring man of his property without just compensation; his property, as in the case of most laboring men, consisting merely of his labor and the right to use it freely.

It has been stated that the large manufacturers, fully expecting that the law would be sustained, have been experimenting with machines to take the place of hand labor, and have succeeded to a considerable extent in this.

It now remains to be seen whether the machines can compete successfully with the tenement-house human hands, since the courts have taken the view held by the health authorities when the bill was introduced, that this was a trade rather than a sanitary question.

THE ECONOMY OF GOOD PROFESSIONAL ADVICE.

THE demand for water-supply and sewerage in towns is growing. The deficiency of information regarding the correct principles and the proper practice to be followed in procuring these important aids to health and comfort is greater than most of our readers would suppose. One result of this ignorance is a lack of appreciation of the fact that an educated and trained judgment is necessary to success in designing and constructing works of this class. In consequence of this, those who want such conveniences are too apt to look only at the first cost of procuring them, and to grudge the expense of having preliminary examinations and plans made by a person whose experience and scientific knowledge qualify him to form a sound judgment, and warrant him in demanding proper compensation for his labor. When it comes to construction there are a number of shrewd, practical, but not professional men, who make the construction of such works their business, and who stand ready to guarantee a supply of water or the removal of sewage at cheap cost, provided they can do the work without interference by troublesome engineers. This is very poor economy. If there is one thing more certain than another with regard to public works, it is that they are never well done except under the most careful and intelligent supervision, and that any corporation, whether public or private, is the weaker party in a contract, and will not receive the equivalent for its money, unless its interests are carefully guarded at every point. It may be taken for granted that whenever a contractor objects to doing work under an engineer's direction he does not intend to do the work well.

Cheap engineers are no better than cheap contractors. A man whose services are worth having is worth paying for. We have in mind a case of recent occurrence where considerations of cheapness in selecting an engineer to construct a water-works costing \$100,000 resulted in defective works, large expenses for reconstruction, and larger fees for competent advice how to rectify defects than would have paid for good supervision in the first place. In hydraulic and sanitary engineering it must not be forgotten that parsimony at the outset involves extravagance in the end.

THE WATER-SUPPLY OF LOUISVILLE.

AN EPIDEMIC of a mild form of typhoid fever has been prevailing in Louisville during the month of October, and the number of cases has been much larger than one might infer from merely considering the number of deaths reported. The greatest number of cases has occurred in those quarters of the city where the water used is chiefly from wells, which are probably polluted in the usual way from leaky privy-vaults and by superficial drainage from foul surfaces of gutters and streets. The *Louisville Medical News* declares that "scarcely a physician in Louisville need walk the distance of a square from his dwelling to find a well with all the conditions necessary to insure its contamination. The water-supply of Louisville during September, whether derived from wells or from the Ohio River, must have been an interesting subject for investigation, and if any examination was made we should be glad to know the results.

THE *London Times* is responsible for the following:

"A Real Sanitary Improvement.—The employment of steel in the manufacture of tin-plate is rapidly increasing, owing to the cheap rate at which steel can now be produced, and it is likely to lead to excellent results in a direction which was not contemplated. The American canned and tinned meat trade has long been aware of the dangers to health that are frequently incurred by those who use this class of provisions, and is beginning to insist that the tins should be made of steel instead of iron as heretofore. It is considered probable that many tinned foods, and especially fish, which were formerly tainted, as it was thought, from defective soldering, are really made injurious to the consumer through the use of faulty irons in the cans. The can-production has now assumed such gigantic proportions that the employment of mild steel in this direction will necessarily be on a large scale also."

The facts are that low-grade steel has been used for some time in the manufacture of tin-plate, but there is by no means universal agreement that it is superior to iron for the purpose. Its use is dictated by economical rather than sanitary motives, and whether low-grade steel or iron is used in the manufacture of tin-plate for canning purposes is a question of little or no sanitary importance.

WATER-TESTING.

WE print in another column the account given by M. Proust of the method employed in testing the water-supplies of Paris, to which we invite special attention. This method is essentially that devised by Dr. Koch, and is simple and easy of application. It is greatly to be desired that this method of examining drinking-water should be brought into general use in this country, and especially so at the present time, in view of the threatened invasion of cholera.

The water-supplies of all our large cities should be tested in this way at least once a week, and the results published, to permit of comparisons. This method is an important addition to that of chemical analysis, and of the two seems much more likely to be capable of improvement and of development into what will be a really reliable test of the purity of water-supplies.

THE RECENT GAS EXPLOSION IN MONTREAL.

PLUMBERS have again been publicly blamed without cause, this time in Montreal. The papers there have devoted considerable space to the condemnation of plumbers, because of the carelessness of a man in the employ of the Montreal Gas Company, who, they assumed, was a plumber, but, we understand, was a tinsmith by trade. It seems that this man, Thomas Brennan by name, was employed by the company to set gas-stoves. He was sent to a house to set a gas-stove. In doing this he apparently had crushed an elbow in applying his tongs to it, or at any rate it was crushed by some one, and he noticed its condition. Instead of putting

on a new one he attempted to stop the leak with cement. He had been in the employ of this company for a number of years, and presumably knew the risks attending any carelessness on his part. And there is no doubt in our mind, after reading the testimony, that he, with his tongs, crushed the elbow which leaked, and which may or may not have been defective before, and that he was too lazy or indifferent to go back to the gas office to get a perfect one, but like many another careless workman, patched it up with cement, and thought it was "good enough." In his letter of defense to the *Montreal Herald*, Brennan alleges that it was his business to set the gas-stoves, but that the defective elbow was between the meter and the main, and consequently he was not expected to repair it. This is no defense whatever. It was his business to see that any defect was properly repaired, no matter whether he was employed to set meters or gas-stoves, or to do anything else, and if he was fit for his position he would have understood his duty. He should have known that a leak in that situation was likely to result in a serious disaster. We do not know whether this man was employed because he was cheap or not, though the reported action of Mr. Josephs, president of the gas company, who, it is alleged, subscribed a dollar, then two dollars, and finally eight dollars, toward the funeral expenses of the unfortunate woman whose death was clearly the result of carelessness on the part of one of his employees, would indicate that this company is not apt to pay liberal prices for either professional or mechanical services. If the gas company has to pay well for this affair it will be a good lesson to such "economical" gas-works managers. Gas companies are as a rule not the most popular of corporations, and in this affair the action of the manager of the Montreal company seems to have been very impolitic, if not very mean.

OUR BRITISH CORRESPONDENCE.

Royal Institute of British Architects—Report on the Health Exhibition—Protest from Manufacturers of Explosives—Prizes of the Institute of Civil Engineers—The River Lea—Drain Inspection proposed in Glasgow.

LONDON, November 8, 1884.

THE fiftieth session of the Royal Institute of British Architects was opened on the 3d inst., at the rooms in Conduit Street, London. The president, Mr. Christian, in his opening address, alluded to the recent open competition for the new admiralty and war offices, and said that in the adjudication nothing could be fairer than the course which was adopted on that occasion; and the fact that the successful exhibitors were two gentlemen (Messrs. Leaming of Halifax) hitherto unknown to fame proved that no undue preference was made. The First Commissioner of Works, who seconded a vote of thanks to the president, was of opinion that Gothic architecture in England was on the decline—in fact, that they had arrived at the end of the Gothic revival; but the president in his reply refuted this idea, and said no doubt the reason why some of the more modern buildings were not Gothic was that Gothic designs did not always show best in plans, and in this particular case of the new Government offices convenience and accommodation had first to be considered.

The Executive Council of the Health Exhibition has just presented its report to the president, the Prince of Wales. It seems that the exhibition comprised the articles of 2,109 exhibitors, not including the Chinese, Japanese, and Siamese exhibits. The literature of the health branch of the exhibition comprised, in volume form, twenty-eight hand-books and the reports of fourteen conferences and thirty-eight lectures. The council is of opinion that if the library established at the late exhibition were made accessible free of charge throughout the year to the many who take an interest in sanitary questions, and supplied with the various publications and papers from time to time issued on such matters, it would doubtless be of great utility. It also advocates the maintenance of the laboratories, which would insure a means of sanitary research and teaching for the future, which England has not had in the past. The council further states that although the expenses of the exhibition, both in its organization and maintenance, have been

heavy, no call will have to be made upon the guarantors. It would be more satisfactory, I imagine, if the council would publish a balance sheet, and its modest statement that the guarantors will not be called upon seems rather like a joke, for the net profits must be something very considerable and quite equal to what I stated last week.

Yesterday a number of members of Parliament had an interview with the Home Secretary to protest against the proposed regulations which would compel manufacturers and storers of explosives to have their places of business watched night and day. The Home Secretary advised the deputation to nominate a committee of representatives to confer with the officials of the home office, in order to secure the maximum of safety with the minimum of interference with trade. A committee of ten, five members of Parliament and five manufacturers of explosives, was then formed by the deputation as suggested.

The Council of the Institution of Civil Engineers is in possession of funds amounting to more \$2,000 per annum, bequeathed to the institution for the purpose of bestowing medals and premiums on the writers of papers of high merit. A list of subjects on which original communications are invited has just been issued to the members. Two of these subjects are of special interest to sanitary engineers, one being "the Ventilation of Sewers, with Summary of Experiments as to the Motion, Pressure, etc., of Gas in Sewers;" and the other "Fluid Presses for Separating Fluids in Semi-Fluids, Particularly for the Treatment of Sewage Sludge." Another of the subjects ought to receive the attention of American mechanical engineers. It is the "Mechanical Properties of Cold-Rolled Metal as Compared with Hot-Rolled Metal, and on the Cold-Rolling of Iron Shafting as Practiced in America."

The Water-Examiner for the Metropolis (Colonel Sir Francis Bolton) in his official report for August, published near the end of September, stated that he was making a personal inspection of the River Lea, and that the result would be made known in his next monthly report. The report has now appeared, but no information is given about the Lea inspection, except that a report has been made "to the President of the Local Government Board." There may be nothing to hide, but the change in the examiner's instructions is suggestive, and persons interested in the London water question will do well to make a note of it.

A proposition was made a few weeks ago by the Lord Dean of Guild Court of Glasgow, Scotland, for the appointment of an inspector of drains in new buildings. If the court should sanction the erection of buildings only on the understanding that the drains should pass the officer's inspection, and should refuse a license for occupation till such officer's recommendation had been complied with, the present disgraceful state of the house-drainage system would soon be set right, so far as new erections are concerned.

SAFETY-VALVE.

PORTLAND (MAINE) SEWERAGE.

THE City Council of Portland, Me., has adopted a plan for an intercepting sewer along the "Back Cove," prepared by Mr. Goodwin, the City Engineer, who thinks it practicable to construct such a sewer at a low level, which will empty itself below Tukey's Bridge without pumping. The committee which had had the matter under consideration was divided in opinion between Mr. Goodwin's plan and one suggested by Mr. J. Herbert Shedd, C. E., which involved the construction of two intercepting sewers, one at a higher level, discharging by gravity, the other a low-level sewer, to be emptied by pumping. Both sewers were planned to discharge into a reservoir of about five acres area at Pomroy's Rock, which would be emptied on the ebb tide. Mr. Shedd expressed the opinion that the nuisance created by the discharge of sewage into the cove would be so far abated by the construction of the gravity sewer draining 82.5 per cent. of the district that the low-level sewer might be postponed several years, but even if it should be considered that the whole district ought to be drained at once, it was in the interest of economy and efficiency to construct one intercepting sewer for gravity discharge and another for pumping. After hearing both sides the Council adopted Mr. Goodwin's plan.

CHARLES H. HASWELL has been appointed to fill the vacancy in the Engineer Commission, which is to superintend, on behalf of New York City, the construction of the Broadway Underground Railway. The commission is composed of Allan Campbell, S. H. Sweet, and Mr. Haswell.

BIOLOGICAL WATER ANALYSES.

IN the course of the recent discussion in the French Academy of Medicine upon the impurities of the water-supply of Paris, Dr. Proust reported the results of a series of cultures made in his laboratory with specimens of water taken from the Seine and other sources, and gave a detailed description of the method employed in this research, which differs slightly from that employed by Koch, although the principle is the same. This method is as follows:

The gelatin for culture is prepared by dissolving in a hundred grams of common water five grams of gelatin and two centigrams of phosphate of soda. When the gelatin is completely dissolved and the temperature of the liquid does not exceed 50° C., there is added to it one-fourth of the white of a fresh egg mixed with three times its volume of water. The mixture of the white of egg and the gelatin is to be thoroughly effected by strong agitation, after which the vessel is to be placed in a water-bath for two hours without shaking. As the albumen coagulates it carries with it to the top all the impurities, after which the liquid is filtered rapidly through moistened cotton.

The vessels employed for the culture are simple test-tubes, closed with corks, and pierced with a hole, through which is passed a glass tube three centimetres long and containing a little cotton. In each of the tubes thus prepared is introduced ten cubic centimetres of the culture gelatin; then they are corked and placed vertically in a vessel containing a small quantity of water, which is closed, and the water brought to a boiling point, this temperature being maintained for from twenty to twenty-five minutes. The tubes thus sterilized may be preserved two or three months.

When it is desired to make a culture the tubes are placed in a water-bath at 30° C., in order to liquefy the gelatin; then with a pipette holding one cubic centimetre and divided into tenths—a pipette which has been passed through the flame of a lamp carefully—a tenth of a cubic centimetre of the water to be examined is introduced into the tube while it is held in an inclined position. The tube thus sown is then agitated gently for two or three minutes, taking care not to form air-bubbles. With the same pipette, taking care to sterilize it, the tenth of a cubic centimetre of the sown gelatin is taken and allowed to run on a thin slip of glass ruled in squares of two millimetres on a side. The gelatin ought to cover a surface two centimetres long and one wide. The slip of glass must have been passed through flame a few minutes before. These slips, covered with gelatin, are to be placed in a moist chamber kept at a temperature of from 15° to 20° C.

At the end of sixty hours each micro-organism develops and forms a little white point, and these may be counted with a magnifying-power of about thirty diameters. The ruling on the glass facilitates this counting and prevents the enumeration of the same colony twice. If then the number of spheres found is multiplied by one thousand we have the number corresponding to a cubic centimetre of water. This method has been found to give constant results, and the following are some figures thus obtained:

Kind of water.	No. of colonies per cubic centimetre.
Water of the Vanne.....	11,000
Water of the Vanne having stood in a reservoir.....	10,000
Water of the Canal de L'Ourcy.....	8,000
Water of the Lariboisière Hospital.....	9,000
Water of the Seine taken at Saint-Ouen.....	20,000
Water of the Seine taken at Clichy.....	116,000

The tubes above referred to having been carefully closed are examined with care every day to note the moment when the gelatin begins to liquefy, which is known by inclining the tube, as the liquefaction always begins on the surface; for a very pure water begins on the tenth or twelfth day; for a pure water, the eighth day; for a bad water, the second to the fourth day.

The temperature at which the tubes are kept should be between 15° and 20° C.

CRECHES AND INFANT SCHOOLS AT THE INTERNATIONAL HEALTH EXHIBITION.

CLASS 34, "Designs and Models of Infant Schools and Crèches," and class 47, "Apparatus and Fittings for Infant Schools and Crèches," are represented somewhat extensively in the sections devoted to France and Belgium. In matters relating to crèches France naturally makes the fullest exhibit.

Just one hundred years ago the Maternal Charity Society of Paris was formed "for the protection of infants up to one year old." Aid is given in the form of money, to obviate the necessity of the mothers leaving home to work.

Poor mothers are helped from the sixth month of pregnancy, ten monthly payments being made of five francs each; ten francs and clothes are given at the time of confinement. About 2,000 children a year are thus protected. "La Société Protectrice de l'Enfants de Paris" was "founded with the object of diminishing the frightful mortality which strikes the new-born, especially in poor families. Convinced that no good results could be obtained by dispensing relief only, an effort was made to spread everywhere the most elementary precepts of hygiene, order, and cleanliness."

During the past five years 5,960 mothers of families have received help. The office of the society is at 4 Rue des Beaux-Arts.

But the organization most widely known and most in harmony with modern methods of aiding the poor is that of the Société des Crèches, 27 Rue de Londres, Paris. The French crèche is a place where mothers who have to go out for day's work can leave infants to be cared for during their absence. The great benefit derived from this charity is unquestioned, since it gives help to those most needing it, and is a means of preventing crime as well as of saving life.

This society exhibits a reduced model of a crèche, one-tenth size, which shows the costume of the nurses, the shape and position of the cradles, and the general arrangements of the room. There are what might be called stalls around the outer walls of the room, made by placing screens so that, when sleeping, the infants are somewhat isolated. Scrupulous cleanliness is enforced, and quiet ways and good temper are demanded of the nurses.

There are plants to make the place cheerful, and ample arrangements for bathing and feeding.

Plans and photographs of various rooms are shown, as well as documents relating to the work.

The volumes of the bulletin of the society give information not only about the crèches in France, but also concerning all similar organizations known to them in any country. Mention is made of several places in the United States where such work has been attempted. For instance, it is stated that a crèche is sustained in New York by an association of ladies, for the protection of the lives of infants.

In 1880 there were in Paris alone 3,048 children cared for 203,639 days in the various rooms of the society.

There are also industrial crèches connected with works where many mothers are employed. This does away with the necessity of an extra walk to and from work, and also allows the mother to spend the noon-hour with the child.

In the Belgian exhibit there is a model of the section of the "Crèche Marie-Henriette," at Antwerp. There are life-size figures in wax of a nurse in a neat gown of bluish stuff, seated by the empty cradle holding an infant on her lap and feeding it from a dish with a spoon; the bath-tub and towels on the other side show what her previous occupation had been. The chubby little two-year-old, with his ball of bright worsted, his toys, and a happy face, stands by her knee. The homely details of the dishes and clothes, with the pots of plants, all serve to make the scene a reality, and it is hard to believe that the figures are not alive.

The spirit of the charity is here most effectively represented by the expression of devotion to the child upon the nurse's face. The air of serenity and peace was very impressive and in contrast to the idea which involuntarily arises when one thinks of the home-life of these poor infants. Altogether this corner forms a very attractive spot in that extensive section of the Belgian exhibit.

GUARDING AGAINST DIPHTHERIA.

THE Illinois State Board of Health has issued a circular containing the following directions how to guard against diphtheria:

1. If one is subject to catarrh, or inflammatory affections of the throat, especial care should be paid to the condition of the general health and to the general hygienic surroundings. There is reason to believe that diphtheria originates spontaneously in such persons when the system is debilitated from any cause.

2. During the existence of diphtheria, avoid crowded gatherings in badly-ventilated rooms, as in theatres, public halls, and even churches. This is of especial importance during cold weather.

3. Secure thorough ventilation and perfect cleanliness of nurseries, kindergartens, school-rooms, and other places where children are cared for. Parents should make it their personal business to secure these in the home and nursery, and to see that those in charge of schools, etc., are also mindful of these important matters. Children are more subject to diphtheria than adults, and the disease is more fatal with them; hence the necessity for these precautions on their behalf.

4. During the existence of a case of diphtheria in the neighborhood do not neglect any soreness of the throat, however slight, until assured of its harmless nature by the family physician.

5. Unless absolutely necessary, do not come in contact with, or inhale the breath of one sick with sore throat. Avoid kissing, or eating and drinking in common with such sick person.

6. Diphtheria has so often appeared where uncleanly conditions have prevailed, when it could not be traced to continuous propagation by contagion, that its relation to filth as a cause may be assumed for sanitary purposes. It is immaterial whether the filth exists in visible and disgusting forms, such as the garbage-heap, the cesspool, or the privy-vault, or in the invisible and possibly inodorous gases from an illy-constructed sewer; from decaying vegetables in the cellar, or in the poisonous exhalations from the human breath and body in unventilated rooms. All these undoubted causes of ill-health should be at once abated.

7. Because of the fact stated in No. 3, an adult may venture, when necessary, to come in contact with a case of diphtheria; but no child should ever be so exposed, either directly or indirectly. Adults who are compelled to visit such cases should take the precaution to bathe and change clothing before going near a child. Children should be prevented from entering the water-closet or privy into which diphtheria discharges are thrown, even after disinfection. In short, they should be removed at once and definitely from any possibility of contagion during the existence of a case.

8. Cats, dogs, cows, swine, and some other of the lower animals, are known to be subject to diphtheria, and fatal cases among human beings have been contracted from them. Avoid, therefore, having anything to do with a cat, dog, cow, hog, or other animal suffering from any throat disease, until it is known not to be diphtheria.

9. Outbreaks of diphtheria have been traced to the carriage of the contagion by the wind. Therefore, it is advisable to close the windows and doors, and avoid as much as possible the side of a house toward a known infected house or locality, especially during the prevalence of high winds from that direction.

10. There are no specifics or antidotes for diphtheria. The resort to such can do no possible good, and may lead to harm.

CESSPOOLS AND PRIVIES.

NEW REGULATIONS OF THE BROOKLYN BOARD OF HEALTH.

THE Board of Health of Brooklyn has amended the provisions of the plumbing regulations affecting the construction and location of water-closets, privies, and cesspools, so that they shall read as follows:

PLUMBING RULES 17 AND 18.
WATER-CLOSETS, PRIVIES, ETC.

17. *On Streets that are Sewered.*—All buildings that are located upon a street in which a public sewer exists must be provided with water-closets, either in the house or yard; privy-vaults will not be permitted when a public sewer exists in the street.

Water-closets will not be permitted in any room or apartment that has not a window, having an area of at least four square feet, opening directly to the external air; they will, however, be permitted in rooms or apartments having no windows communicating directly with the external air, provided that there is an air-shaft extending up to or above the roof, having an area of not less than four square feet, with an opening to the external air of an equal area, this opening, at the top of the air-shaft, can be arranged by extending the shaft above the roof and providing a sash, of an area equal to that of the shaft, which can be controlled by cord and pulley from below.

In no class of buildings, whether public, private, or tenement, will water-closets be permitted in cellars. [A "cellar" shall be taken to mean and include the lower story of any building or house, of which one-half or more of the height from the floor to the ceiling is below the level of the curb of the street adjoining.] In tenement-houses gangs of water-closets will not be permitted in the basement, unless a ventilating-shaft (as above described), of an area not less than four square feet, is provided.

Iron privy-sinks will only be permitted when located in the yard, under the same conditions as privy-vaults. They must be set on the surface of the ground, and no masonry will be permitted on top of the casting.

All water-closets must be furnished with a sufficient supply of water to keep them at all times clean and well flushed.

All water-closets located above the first story must be supplied from a tank, which must hold not less than ten gallons of water for each water-closet which it supplies.

18. *On Streets that are Not Sewered.*—Water-closets will not be permitted in any building situated upon a street that is not sewered; in such cases water-tight privy-vaults must be provided.

Waste-water from houses situated on unsewered streets must be conveyed to cesspools that are water-tight. Into these cesspools rain-water must not be conducted. Rain-water must be conveyed to cisterns that are water-tight or to the street gutter.

No privy-vault, sink, cistern, or cesspool shall hereafter be made or rebuilt in the city of Brooklyn within twenty feet of any dwelling or factory without a special permit in writing from this board. All vaults, sinks, cisterns, and cesspools shall be made and kept water-tight. This must be done in the following manner: The inner four inches of the bottom and sides must be of hard brick soaked in tar, or dipped and laid in hot roofing-cement. If tar-soaked bricks are used, the inner surface of the vault, cesspools, etc., must in all cases be covered over with roofing-cement, applied hot.

As amended November 1, 1884.

PLUMBING AND WATER-SUPPLY IN THE RESIDENCE OF MR. H. H. COOK.

No. II.

(Concluded from page 555.)

THE first part of this description was devoted to the drainage and the hot and cold water-supplies of the building. We here give some views of the plumbing fixtures, etc., upstairs in the house, and such other matters as we think will be of interest, such as the warming apparatus and elevator service.

Figure 6 shows a "cut-off" as it appears on the third floor. A *cut-off*, it may be explained for the benefit of the untechnical reader, is an arrangement of valves and pipes whereby the occupants of the house may at once change the pressure and the direction of the supply in the pipes so as to use water either from the tank-system of the pipes or from the street-system direct, and it is made necessary by an intermittent supply, or a variable pressure in the street-mains.

In this case the hot and cold tank-supplies enter the three-way cocks at the top, and the hot and cold street-

of heavy white imported porcelain, and the mountings are of Italian marble, the slabs being two inches thick. The wainscoting is also of Italian marble ashler in large slabs, as well as the floor. The water-closet is raised one step, and the fixture is bolted to a heavy marble safe. The apron shown is also of marble, the only wood-work being the rosewood seat.

To reach any of the pipes or valves connected with these fixtures, it is not necessary to disturb or remove any of the marble. In the adjoining room, and just opposite to the foot of the bath-tub, is a small door in the wainscoting. This gives access through the wall to the space between the tub and the marble, which is larger than usual, and sufficient for a thorough inspection, and to do considerable work, such as packing valves or joints. This room is warmed by a direct-radiator of special design, and resembling somewhat the old sheet-iron heater, but made of copper, with sweat-seams, and arranged to work on the "fractional-system."

The dressing-room is finished in selected maples, with cabinets and drawers of the same. The wash-bowl

seamless-brass, tinned, with brass fittings. The soil and vent pipes are extra heavy cast-iron selected pipes and fittings, and the general principle is that approved by the New York Board of Health, with the addition of an extra vent-pipe to the bowls of the water-closets, which run separately to the roof.

The house is fitted with one of the Stokes & Parrish Machine Co.'s hydraulic-elevators. It is of the horizontal-cylinder type, of long stroke, being multiplied in the sheaves but three to one. A feature of the car is an arrangement to make it convenient for adult members of the family to use it. For this purpose, it is operated from the landings, as well as from the inside of the car. The doors leading to the elevator-shaft are self-closing and self-locking, and can be unlocked only from the inside by the car itself as it passes. When the car is stopped at the right level at a landing the door can be opened from the outside. The starting of the car again closes the door and locks it. The elevator construction is of iron, excepting the car finish, and the well-holes are lined with iron.

The heating apparatus was put in by Mr. Frederic

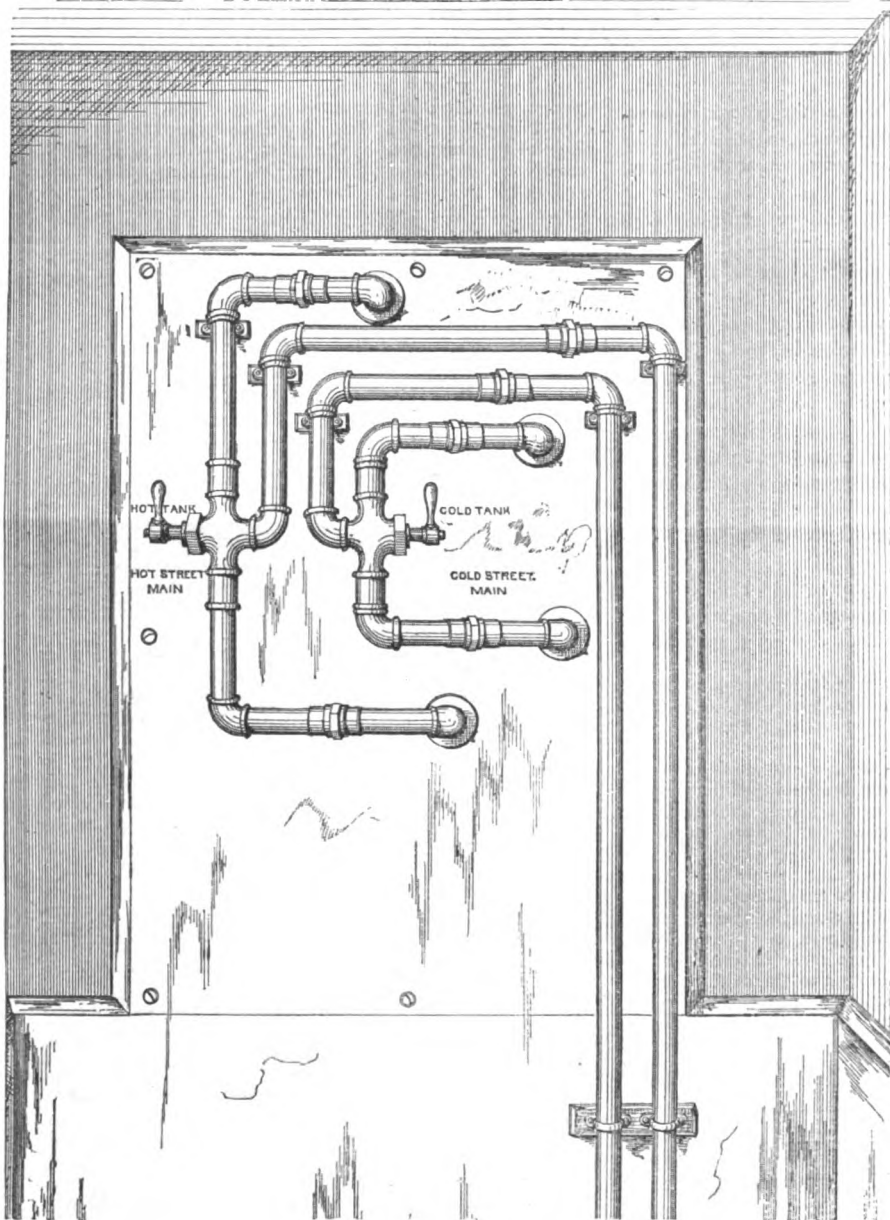


FIGURE 5.

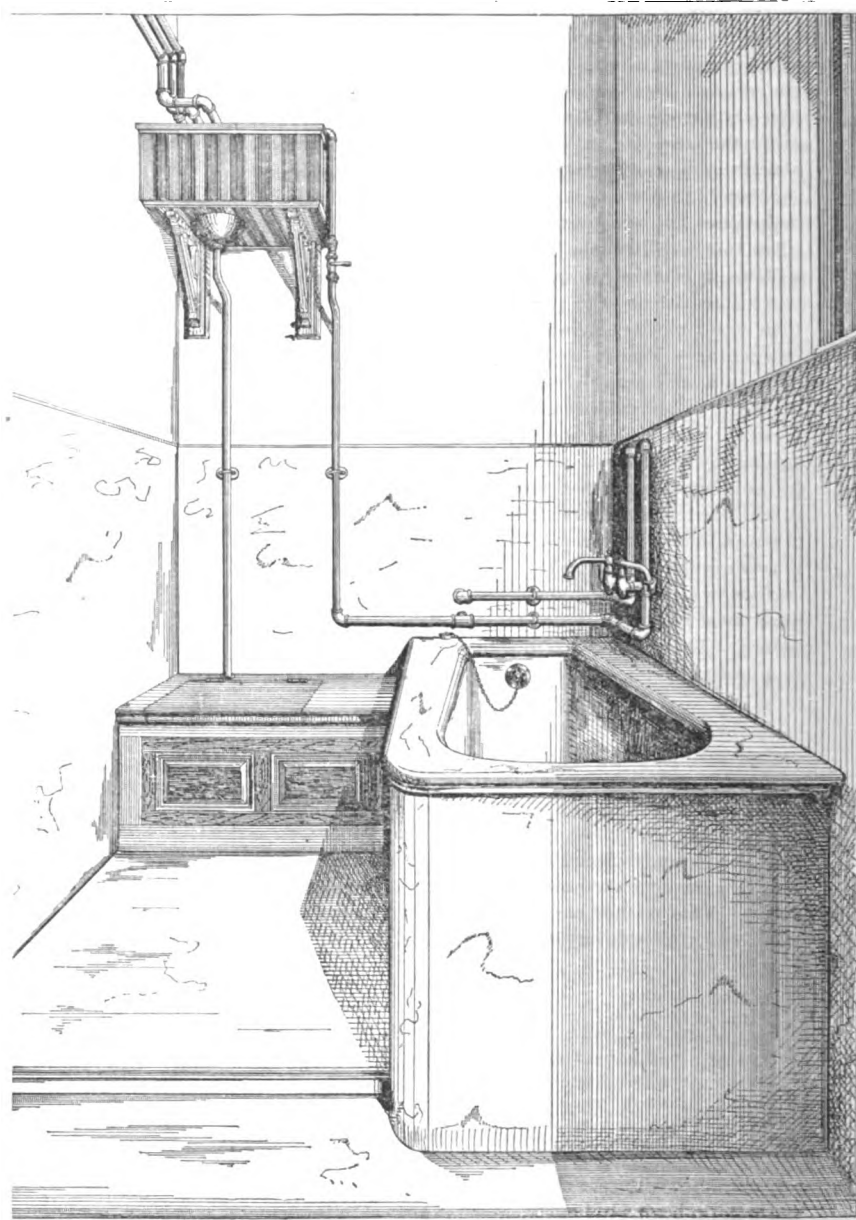


FIGURE 10.

pipes enter at the bottom, leaving the hot and cold supply-pipes for the floor to be attached to the cock at the end of the hollow plug, the plugs being held in position by stuffing-boxes. The return-pipes, which maintain a circulation between this point and the tank and street pressure boilers, start just inside the marble slab, and return by way of the riser-recess to the respective boilers. The object of not carrying the circulation near the fixtures is to prevent the possibility of water passing from the high-pressure service to the low-pressure, through the circulating-pipes, and loosing the tank-water into the street-mains, should the extra cocks and pipes, which would be made necessary, not be manipulated properly; as, for instance, to turn the cock in the rising pipes to let the water flow from the upper system, but allowing it to go down the return-pipe to the low system by not attending to the return switch-cock also, or *vice-versa*.

Figure 7 is a view in Mrs. Cook's bath-room, and Fig. 8 is one in her dressing-room. The bath-tub and sitz-bath are

faces the window, as shown, and is backed by a plate-glass mirror. The floor is of wood, and at the time our sketch was made was not covered, but a light-pattern moquette carpet is to cover it.

Figure 9 is a view in Mr. Cook's bath-room, standing with one's back toward the window. The tub is of white porcelain, and all else—floor, steps, and wainscoting—is of white Italian marble, excepting the cover and seat of the water-closet. The tub is large, and is set similar to a plunge-bath at the top of the terraced steps. The space formed by the terrace can be entered through a door in the wainscoting of the adjoining room, giving access to all the pipes, etc., without removing any of the marble. This same principle is carried out throughout the house to all the large fixtures.

Figure 10 is the servants' bath-room. All here is of marble, as in the more pretentious parts of the house, a peculiarity in this room being the enormous swing-cock of the bath-tub. All the water-pipes above the ground are

Tudor, of 202 East Twelfth Street, and is principally window-radiation on his "fractional-system." There are two boilers, each ten feet long by thirty-six inches in diameter, with thirty 3-inch tubes. The main steam-pipe used is four inches in diameter, and the number of square feet of radiating-surface is 1,840, divided into fifty-five radiators or coils.

The building is practically fire-proof, very little wood being used in its construction. In a future number an outside view of the house will be given on a supplementary sheet.

A CHARITY organization society was formed at New Brunswick, N. J., November 20, making the thirty-fifth organization of the kind in the United States. Representatives of most of the churches and benevolent societies of the city were present, and addresses were made by President McIntosh, the Hon. Charles S. Fairchild, Mrs. C. R. Lowell, and Charles D. Kellogg, of the New York Charity Organization Society.

SANITARY INSTITUTE OF GREAT BRITAIN.

No. III.

(Continued from page 533.)

(Special Correspondence of THE SANITARY ENGINEER.)

[THE great amount of timely matter awaiting publication obliges us to restrict extracts from the mass of papers and discussions sent by our special correspondent from Dublin. We select those which are likely to be most generally interesting to our readers. The full text of the papers we abstract from, as well as those we are obliged to omit, will undoubtedly be printed in the "Transactions" of the Institute, where they can be read by those specially interested.]

Mr. W. Eassie read a paper on "The Collection and Disposal of House-Refuse," in which he stated that any system of taking the refuse of towns or cities by barges out to sea and emptying them there must have a very poor notion of how far more satisfactorily and economically this material can be disposed of by separation, appropriation, or destruction. "At New York, and I believe in Liverpool, a great deal of refuse has been got rid of by sea immersion, but it would appear that it was simply for want of space and convenience to utilize it that this crude system of disposal was resorted to."

Mr. Eassie thinks that the burning of the refuse is the most satisfactory system extant.

This was followed by a paper on "Public Cleansing," by James Young, who said, by the recommendation of the Royal Commission in 1879, that the entire scavenging of Dublin, both public and domestic, be undertaken and carried out by the corporation.

Subsequently the Cleansing Committee was formed, action was promptly taken, and the public scavenging was reorganized. Loans were obtained, ground was acquired, stables and other offices were built, horses and plant were purchased, and in 1882 the domestic as well as the public scavenging of the city was undertaken.

The city of Dublin includes an area of 3,754 acres, and contains a population of 250,557, or 65.8 per acre. The assessable value may be taken at £652,000, one penny in the pound producing, in round numbers, £2,450. The cleansing of the city, public and domestic, cost, in 1883, £26,745, and at present 440 men and 102 horses are employed in the work.

The Cleansing of the Tenement Yards and Urinals.—In this section of work there are sixty-nine men, including foremen, employed. Their working hours are from six in the morning till eleven, and from twelve noon till five P. M. Each man has his own beat, which includes on an average about ninety yards, and each gauger is responsible for all the yards in his district. In this way the 5,000 tenement yards, which are common to a number of families, are swept daily, and, at the same time, the closets are mopped and washed. They also wash with hose some of the filthiest courts and yards which are sufficiently well paved to admit of this highly commendable process.

Street Scavenging and Watering.—There are in all about 113½ lineal statute miles of streets within the municipal boundary of Dublin. Of these there are:

- 20¼ miles of new set paving.
- 22¾ " boulder "
- 70½ " macadam.

On account of the extensive area of macadamized streets we have a larger amount of dust and mud to contend

with in proportion to the population than in most cities.

In 1883, 27,000,000 gallons of water were spread on the streets, and 100,748 loads of scavenge were removed, 36,645 from paved streets, lanes, and markets, and 64,103 from the macadamized streets and roads.

In this section of the work 224 men, including foremen, and 63 horses are employed.

We have ten horse-drawn sweeping-machines in use, with which all the principal streets are swept by night; the back streets and lanes are swept with hand-brushes by day.

The asphalted streets are washed regularly with hose; all the first and second-class streets are cleansed daily, and the third and fourth rate streets are done three times a week.

The Removal of Night-Soil and Domestic Refuse.—This section of the work, commenced in May, 1882, is now fully

Mr. Young states that it has been decided to convey the Dublin unsalable refuse to sea in a hopper-barge, the cost of this vessel being £5,950. The fixed ash-bins now being erected in the tenement yards of Dublin, at the instigation of the sanitary authority, are calculated to contain the house-refuse for one week or so.

The walls are 9-inch brick-work, the roof galvanized corrugated-iron or slates; the floor is from three to six inches over the level of the yard, and the floor and sides are rendered water-tight with cement.

(TO BE CONTINUED.)

SEWAGE DISPOSAL.*

BY PROFESSOR HENRY ROBINSON, M. INST. C. E.

I.—SEWAGE DISPOSAL ON LAND.

THE object of dealing with sewage on land may be taken as twofold—namely, to purify it (which is the sanitary object), and to utilize its manurial products (which is the agricultural object). Where want of skill, or where prejudice has existed, these two have not been properly separated, and the results have been in many cases unfavorable to sewage disposal on land from either of the before-mentioned points of view.

It has been regarded as an axiom that clay land cannot be employed to clarify sewage. This is true when it is proposed to pour the sewage on it as if the land were porous. Very recent experience, however, has led to clay land being converted from an impervious to a pervious condition, by which it has been successfully utilized. This is effected by digging out the clay to a depth of about six feet, burning it into ballast and replacing it in layers, interposed with an occasional layer of open alluvial soil, the whole area being well drained with a free outlet for the effluent. We have successfully carried this plan out, and with this result, that whereas it was not possible previously to clarify the sewage of 100 people to an acre of clay land, the prepared filtration-area has been able to continuously clarify the sewage of about 1,500 people to the acre. The cost of converting clay land into this form of filter may be taken as varying from £750 per acre to £1,000 per acre, according to local circumstances. One area which we have just completed has cost £1,000 per acre. Before sewage is passed on to these filters (or on to land) it should be strained so as to remove the larger particles. The best arrangement for this purpose is to pass the sewage upward through a straining medium (not downward), and to run the solids from the bottom of the straining tank on to a low-lying piece of land for digging in as they are run out.

If open, porous land is available for sewage purification, and if it can be drained six feet deep to a good free subsoil, so that the effluent can get readily away, we find that the sewage of from 600 or 700 people can be dealt with on each acre per annum with both good agricultural and sanitary results.

Where such a filtration-area is made to form part of a sewage-farm it acts as a safety-valve, and enables the land and crops to have a rest when they do not require further irrigation: at the same time the process of purification is not interrupted.

Experience during the past year or two has proved the feasibility of preserving green crops in a succulent state by compressing them in silos, so that they can be utilized for cattle-fodder in the winter. This system deserves notice in connection with sewage-farming, as we are of opinion that it will prove a valuable means of getting over the well-known practical difficulty which is experienced of finding a market for the large amount of green crop which is produced by sewage irrigation. In speaking of this system the term "Silo" is applied to the artificial chamber or receptacle for green crops (such as grass, vetches, clover, etc.). The term "Silage" is applied to the crop thus treated, and the term "Ensilage" is applied to the process of making "Silage." The details of the construction of silos cannot be referred to here beyond stating that what is required is to construct a pit or chamber either in the form of an excavation in the ground, with a brick or other lining,

* From a paper read at the Dublin meeting of the Sanitary Institute of Great Britain, October 2, 1884.

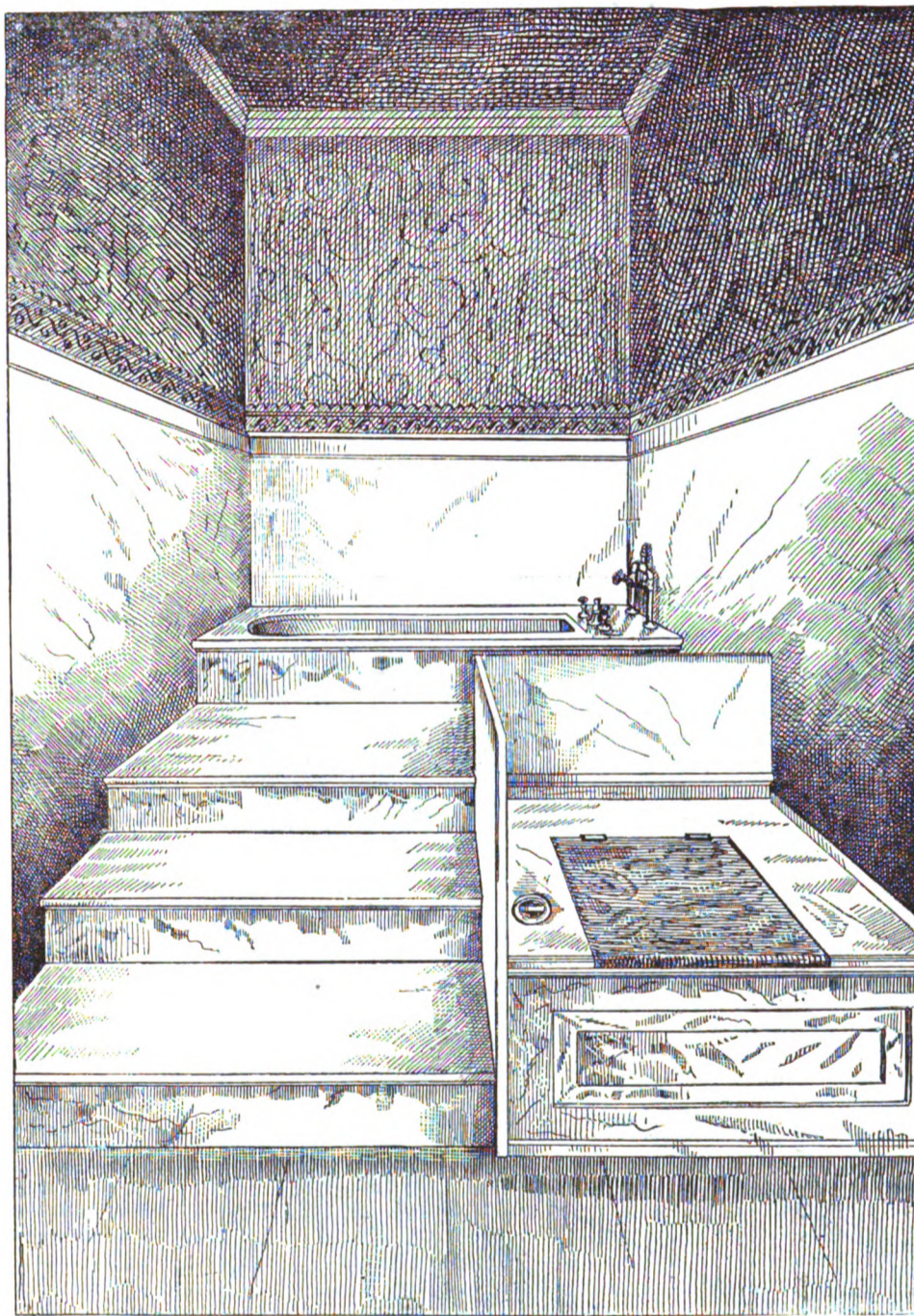


FIGURE 9—VIEW IN A BATH-ROOM, SHOWING TERRACED BATH.

organized, and a staff of 110 men, including foremen and 39 horses, are employed.

During the present year the quantity of house-refuse removed per day has exceeded 250 tons. The cleansing of the ash-pits is done by night—that is, between the hours of 10.30 P. M. and 9 A. M., and the men are paid according to the weight of refuse removed.

When the domestic scavenging was undertaken there were in the city 18,165 ash-pits, of which number more than one-half were wet sunken pits, and in addition there were 11,577 common privies.

During the last two years about 3,000 privies have been abolished, and a corresponding number of water-closets have been erected. There are now about 18,000 water-closets in use, so that in a few years more we hope to see Dublin a water-closeted city.



FIGURE 8.

or by building it above the ground. The object is to enable the green crop to be deposited in an air and water tight chamber, in which pressure can be applied to the crop to compress it. This is effected in some cases by well treading the crop after it is laid in the Silo, and then spreading layers of earth to about a couple of feet and pressing the covering well down. Another way is to construct the Silo with a movable covering of the exact size and shape of its interior. This cover is raised and lowered by suitable chains and rollers. After the crop is placed in the Silo the cover is lowered and weighted, so that a thorough compressing is effected; the weight applied giving about 200 pounds or so per square foot of surface. Salt is sometimes added as the crop is placed in the Silo. A crop thus dealt with is sorted for months; when the Silo is opened the fodder is found preserved, and in a state readily taken to by cattle. It is desirable to choose the site for the Silos so that the fodder is preserved somewhere near the place of consumption; also to lay out the works so that as little handling as possible is required. For instance, the Silo should be on sidelong ground, so that the crop can be carted and tipped at a high level, and the silage taken out for use at a lower level.

2.—SEWAGE DISPOSAL BY CHEMICAL TREATMENT.

In the last edition of our book on "Sewage Disposal," in speaking of precipitation, we said that "the purification

of sewage by chemicals has been the subject of misapprehension, owing to the extravagant advantages which have been claimed for the system by its advocates." This is even more true now than it was two years ago, inasmuch as in the recent scheme for dealing with the sewage of the Thames Valley chemical treatment *per se* was relied on to produce from the sewage of a future population of 350,000 an effluent at all times fit to be discharged at one point into the River Thames above London, but the Parliamentary Committee rejected it. One part of the report of this committee deserves attention, when speaking of sewage treatment by chemicals. It is as follows: "Your committee believes that in these cases the process of filtering the chemically purified effluent through earth ought, if possible, to be adopted, which was not provided for in the scheme under its consideration." Experience shows that it is impossible at all times and seasons to be sure of a constant and uniformly high standard of purity, and that chemical works should be supplemented by a filtration-area, however small. The addition of this, however, enables a lower standard of effluent from the precipitation-tanks to be admissible, and this can be attained with very simple and inexpensive chemicals.

In the course of our practice we have had to advise as to the majority of the processes, and to design the works for their being carried into operation. We have found that the cost of such works complete varies from .091 to .166 of a pound per head of the population, and that the average cost of the works at several towns which we have been connected with is .123 of a pound per head. This figure may be conveniently followed by that of the cost of treatment, which we find varies from .036 to .110 of a pound per head per annum, and an average of several places gives .06 of a pound per head per annum. The above figures apply only to places where the very highest standard was sought to be attained, but our more recent experience leads us to modify the arrangements of the works and cost of treatment, so as to rely on filtration of the effluent as an important factor. We estimate that under these conditions the cost of the works complete would be about .075 of a pound per head, and the cost of treatment .04 of a pound per head per annum.

The disposal of the sludge has always been a difficulty in these works, but this is now overcome in two ways: either by digging it into the ground, as is done in Birmingham now, or by pressing it into cakes in filter-presses. It is found at Birmingham that one ton of sludge with 90 per cent. of moisture is produced from 1,000 people. There the lime process is used. We have found that about one ton to 2,000 people is produced where a salt of alumina or iron is used with the lime. At Birmingham the sludge is dug into the land adjoining the works, and it is found that one square yard of land will take one ton of sludge with 90 per cent. of moisture once in three years, which results in three yards of land being required to be provided for each ton of sludge. This system of digging in sludge is successfully carried out as regards freedom from nuisance. Where land is not available to dig in the sludge it is necessary to make it portable for removal and disposal away from where it is produced. This is best effected by filter-presses. Appliances are made for this purpose, by which the sludge is pressed to a consistency of about 50 per cent. of moisture. The cost of effecting this is about .007 of a pound per head per annum. It is found in practice that where the sludge is produced by straining the solids from sewage before passing it on to land for purification, it requires a little lime to enable the press to work well. About two barrow-loads of lime for each ton of pressed sludge suffices.

It has been thought that the cost of precipitation would be covered, and even a profit gained, by the sale of the sludge. This hope, however, is not nearer realization now than it was in the time gone past, when chemical processes were relied on to turn sewage from a profitless into a profitable commodity. There is, consequently, less justification now than there was at that time for adopting a precipitation system for sewage disposal. It is entirely a question of carefully considering the engineering and financial points involved, regardless of the sanguine representations of interested or enthusiastic advocates of any particular system.

As mistakes are constantly being made in regard to the weights of sludge with varying degrees of moisture, the following table may be useful:

100 tons of sludge with 90% of moisture	50	tons with 80%
100	33.3	70%
100	25	60%
100	20	50%
100	16.6	40%
100	14.3	30%
100	12.5	20%
100	11.76	15%

3.—SEWAGE DISPOSAL BY DISCHARGE INTO RIVER OR SEA.

We will next deal with the conditions which should be fulfilled where it is sought to utilize a river or the sea into which to cast the sewage of a town. If it can be ascertained beyond question that at the proposed point of discharge the currents at all times will carry the sewage right away, and will not at the same time produce mischief at a distance (which is often omitted from the consideration), then that arrangement may be accepted as a good one. This, however, seldom occurs.

The effect of discharging sewage-matter into a river has been the subject of much controversy among chemists. Some allege most positively that the injurious properties in the sewage are indestructible. This has led to alarmists demanding that under no circumstances ought sewage to pass untreated into a river. We have given considerable attention to this vexed question, as it requires to be grasped by any engineer who has to advise on the selection of sewer outfalls, and it appears to us that the balance of evidence



FIGURE 7.

is against the alarmists. Every river has a certain power of oxidizing impurities in proportion to the extent of oxidation of the river itself. Besides this, there are the powerful purifying influences exercised by the plants and animalculæ which exist in rivers.

It has been ascertained that entomostraca consume dead animal-matter, and where this is wanting they do not live, but where it is in abundance they thrive. It follows, then, that these minute animals exercise an important function in absorbing sewage impurities. They multiply prodigiously in these impurities, and are both created by them and fed upon them, converting foul and dangerous matters into harmless ones in a similar way to that which we have referred to as nitrification when speaking of the action of bacteria in the soil. Considering that these organisms arise from and are fed on concentrated filth, it is obvious that they cannot live when the conditions favorable to their existence disappear. This would be the case when the sewage is discharged into a large volume of water with a different temperature to that which suits them, and with powerful oxidizing influences at work. These conditions, added to the difficulty they must experience to find their natural food—namely, concentrated sewage—where the sewage-matter becomes so greatly diluted, accounts for the fact that in a short run of a good river sewage impurities largely disappear. The action of weeds and plants also aids purification to a very large extent. Minute plants, such as confervoid algæ and the like, also assist in oxygenating the river, as when exposed to light they decompose carbonic-acid, and liberate oxygen.

The practical question which has to be answered in every case where sewage is proposed to be discharged into a river requires to be approached from two points. The first is whether a nuisance will be caused at the spot to which objection would be taken. If this is likely to be the case, then the fact that the sewage will get purified in a short run of the river does not meet the objection. The second point requires a careful consideration of the condition of the river, both from an engineering as well as from a chemical and biological point of view. Decisions on these matters have too often been arrived at in a rough-and-ready way. They require skillful treatment, as the interests—both commercial and hygienic—which are affected are too great to permit of them being dealt with by any who are not well informed and careful.

The general conclusions which we deduce from our observations are as follows:

1. That chemical precipitation is not so necessary now as it was considered to be a few years ago in cases where land for irrigation is not procurable.
2. That the efforts to profitably remove the manurial elements from sewage by chemicals not having been successful, the system should be adopted *per se* only where a filtration-area cannot be obtained.
3. That the success which has attended the construction of filtration-areas where the land is clayey, and the successful results which have been obtained from a combined straining of sewage and of subsequent filtration through small areas of artificial filters, point to the adoption of one or other of these systems in many cases where chemical treatment would previously have been advised.
4. That the injurious effects of passing untreated sewage into a river depend upon not merely the relative volumes of the sewage and the river, but chiefly upon the power of the river to oxidize the sewage, which power is in proportion to the extent of oxidation of the river itself.

OUR ILLUSTRATED SUPPLEMENT.

THE MUTUAL LIFE INSURANCE COMPANY'S BUILDING.

Our supplement contains an illustration of the new Mutual Life Building in Nassau Street, New York City, specially drawn for THE SANITARY ENGINEER. It is on the west side of Nassau Street, on the site of the old general post-office, and occupies the whole front of the block between Liberty and Cedar Streets, the front dimensions being 187 feet with the flanks, 115 feet and 111 feet, respectively.

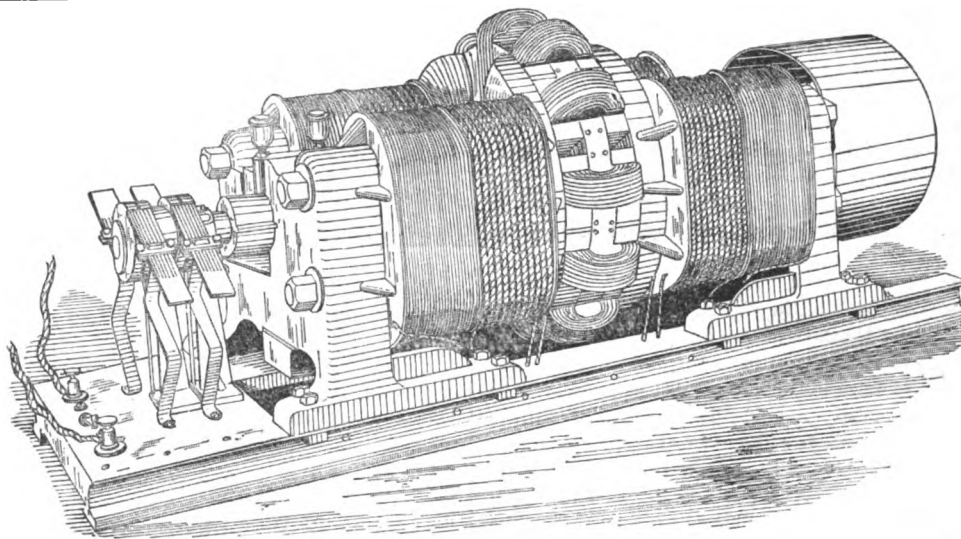
It is in the style of the Italian renaissance. The principal façade, on Nassau Street, is composed of three distinct general divisions—the right and left front line almost meeting the sidewalk line, with the centre sufficiently back from the street line to admit of a massive portico over the principal entrance and steps, without encroaching upon the walk, leaving an uninterrupted street line. On account of the extreme height of the building, which is about 150 feet, divided into eight stories, the portico reaches the third-story windows, being two stories in height. The lower story of the portico is granite, and the upper one lime-stone, corresponding in material with the rest of the building above the first story. The lower portion forms the principal entrance, and the upper a balcony. The heavy granite piers which form the outer corners are flanked with polished granite columns, which are again flanked by the main piers of the building, which are here alternately fluted and polished courses. The capitals of these columns and piers are white marble. In the upper part of the portico the piers are paneled, the fields of which are filled with foliated carving in the renaissance style. These piers are flanked and supported within with turned and polished granite columns, which directly support a vaulted arch, richly paneled and carved. The capitals of the corner piers are ornamented with typi-

cal heads representing the four great continents, and are from models by Samuel Kitson, of Rome.

The stories of the building are grouped into three principal zones, which are defined by heavy cornice courses. The lower belt or zone is Quincy granite, and forms a base for the superstructure, and contains the basement and first story. The second is Indiana limestone, and contains the second and third stories; and the fourth, fifth, sixth, and seventh stories are within the limits of the third belt, which is also limestone, above which comes a smaller or crown belt, in which is the eighth story, and which is surmounted by a balustraded parapet, which shuts off from view a ninth story, in which is a restaurant, the housing of the elevator machinery, and the water-tanks.

Entering the main hall through the archway of the portico it will be noticed that the sides of the halls and stairways are lined with Italian marble, relieved with pilasters of onyx of varied colors. The stairs are white marble, supported on bronzed-iron strings, with iron railings winding within a bay, which projects prominently into the court in the centre of the building, securing light from three horizontal directions and from a skylight at the roof.

The main offices of the Mutual Life Insurance Company occupy the second and third floors of the building. The four massive iron columns which support the main girders of the great room are surrounded with brick-work anchored to them, and finished with scagliola in imitation marble. At the wall ends of the same girders are pilasters similarly finished and polished, with gilded capitals. The three centre windows of this room are arched, and the spandrels are decorated with allegorical figures in bas-relief. No wood of any considerable amount is used in the



BRUSH COMPOUND SHUNT-WOUND DYNAMO FOR INCANDESCENT LIGHTING.

building, doors and casings and some of the flooring being the principal parts. The floor-beams and joists are of iron, and the spaces between them filled with fire-proof tiles and brick; the under side of the beams being also covered with fire-proofing material.

In our issue of May 22, 1884, are to be found floor plans illustrating the ventilation, heating, and lighting of this building, followed in the issues of May 29 and June 12 and 19 by descriptions of the plumbing arrangements, etc.

The cost of the building, exclusive of the ground, is nearly \$1,500,000. No contracts were let. The work was done by percentage and day's work, and in sixteen months after the commencement of the tearing down of the old buildings it was occupied by the Mutual Life Insurance Co.

The architect was Mr. Charles W. Clinton, who now occupies offices in the same building. Mr. Thomas E. Brown, Jr., civil engineer, was his superintendent of construction.

The brick-mason was Mr. Joseph Thompson, of 256 West Fifty-Second Street, who furnished and laid about 4,000,000 bricks.

The marble-work was done by Mr. A. L. Fouchere, of 433 Seventh Avenue, who supplied the marble ashler for floors and wainscots, and carved and paneled marble for partitions, etc.

The stone-work was furnished by J. G. Batterson, of Hartford, Conn.

The iron-work was done by Messrs. J. B. & J. M. Cornell, 144 Centre Street.

Messrs. Vreeland & Van Dorn, of 218 West Thirty-seventh Street, furnished flooring, and the finishing wood-work was done by Mr. George Mulligan, of 33 East Thirty-second Street.

The gas-fixtures were supplied and set by Messrs. Travis Murray & Co., of 140 Greene Street.

The sculptors were Messrs. Ellin & Katson, of 519 West Twenty-first Street.

The fire-proofing, blocks, etc., by the P. B. Wright Fire-proofing Company, of 60 and 62 William Street.

The elevators by Otis Brothers, of 92 Liberty Street, and grates by W. H. Jackson, of 31 East Seventeenth Street.

ELECTRIC-LIGHTING EXHIBITS AT THE INTERNATIONAL ELECTRICAL EXHIBITION.

No. V.

(Continued from page 582.)

THE BRUSH EXHIBIT.

THE Brush Electric Company, of Cleveland, Ohio, has a large exhibit, especially of arc-lights. Its 65-light dynamo, claimed to be the most powerful arc-lighting machine yet manufactured, is said to be running sixty-four 2,000-candle-power lamps, with 44-horse-power. These include those suspended from two of the roof-trusses in the main building, and those outside the building. A smaller machine runs about thirty 1,200-candle-power arc-lamps in the west gallery and towers. Another, having a capacity of fifteen 4,000-candle-power lamps, is used principally for running Brush motors and charging two storage-batteries, each having a capacity of running forty Swan incandescent-lamps of 16-candle-power for seven hours with one charging.

A great number of arc-lamp carbons is shown of various sizes, from the common seven-sixteenths to the mammoth 2½-inch, which latter is the size used in the 120,000-candle-power search-light supplied to the British Navy.

For incandescent lighting, which this company has only recently undertaken, a new compound shunt-wound dynamo, shown in the accompanying illustration, is employed. The principle of the machine was patented by Mr. Brush several years ago, but has not been used except for plating until recently. The field magnets are wound partly in shunt and partly in series, the fine winding seen in the illustration representing the former, and the coarse the latter. This is the peculiarity of the dynamo, and is designed to give a constant electromotive force, regardless of the number of lights in use, thus making the system practically self-regulating. Since, in a series-wound machine for incandescent lighting, the more lights turned on the brighter they become (the resistance decreasing with the increase in the number of lights), while in a shunt-wound the reverse is true (less magnetism being produced the greater the number of lights), the resistance of the two windings on the field may be so proportioned as to keep the electromotive force constant, no matter what current is flowing in the external circuit. The machine referred to is said to fully accomplish this, and to be actually self-regulating, except adjustment of the brushes. The test of this machine by the Board of Examiners showed this to be the case.

The Swan glow-lamps have been adopted by the Brush Company for use with this machine, which is claimed to run from nine to ten 20-candle-power size to the horse-power.

About 330 20-candle-power Swan lamps are being run by two dynamos, 160 being placed quite close together on a rack about six feet long by four feet high, to show that any number of lights can be turned off without affecting the intensity of the remaining ones. Quite a large exhibit of furnished interiors, drawing-room, bedroom, office and mill-room, lighted by the Swan lamps is shown.

(TO BE CONTINUED.)

PLUMBERS' CONGRESS AT THE INTERNATIONAL HEALTH EXHIBITION.

No. III.

(Continued from page 581.)

(From our Special Correspondent.)

A PAPER on the "Apprenticeship Question," by Mr. Fred. Wells, of Worcester, was next read. Referring to an assertion of Lord Hampton, made at a public meeting some time since, to the effect that the days of apprenticeships were past and gone, and that the dissemination of technical education must for the future provide good artisans, the writer dissented emphatically, holding that never more that at present was apprenticeship necessary, of long duration and strict terms. The duration should depend on the nature of the master's business. If this be strictly plumbing, and the apprentice is quick, six years should be sufficient, but for a youth in a shop where he would have to become a "three-branch hand"—in other words, a plumber, painter, and glazier—he held that seven years was the shortest period possible. A master could not be too careful in selecting suitable boys, and should endeavor to ascertain from the boy's school career his fitness for the trade selected. Regarding conditions of indenture, the writer advocated the introduction of a clause binding the apprentice to attend technical schools, and to pass at least two examinations during his term of service, the first elementary and practical, the following advanced and scientific, treating on properties of metals, hydrostatics, etc. Help on the part of the master would enable an apprentice to pass these examinations without difficulty or interference with the shop-work, and the payment of wages and granting of certificates of service could be made conditional on the apprentice's performances. No one should be allowed to assume the responsible position of master unless properly qualified. Under the existing disorganized state of things, membership of an accredited trade society might be insisted on, and eventually an insistence on passing an examination such as that indicated for apprentices. Mr. Wells further suggested the establishment of plumbers' competitions at industrial shows, pointing out that shoeing, shearing, and other trade competitions are of frequent occurrence.

The views set forth in the paper were indorsed by Mr. John Smeaton. He thought that an apprentice should be able by consent of both parties to the indenture to leave one master and finish his time in another shop, so as to get diversity of practice. A difficulty presented itself, of course, in that some boys will never make good plumbers, and nothing further could be done in such cases than to indorse the certificate. As regards the duration of service, he thought that if a master did his duty to the lad, seven years should suffice to make an efficient workman.

Mr. Scott Moncrieff was of opinion that if the plumbing trade had the same standing as other interests the proposal to revive the apprenticeship question would be deemed a retrogressive movement, and would have made no headway. The steam-engine had exploded the custom in other trades; that of the plumbers alone seemed to have stood still and not gone with the times. Public interest was now aroused on the question, and the proposal would therefore probably be carried through. The old-fashioned period was, in his opinion, not suitable at present, and five years should be sufficient under ordinary circumstances. A further period of two years might be added as one of probation, in which the apprentice could try other shops, so as to enable him to make a choice of employer, his indentures being indorsed for general information accordingly. It was the desire of the council of the Plumbers' Company to utilize the meeting to embody the views of the congress. He therefore moved as a resolution that "in the opinion of this congress it is desirable the apprenticeship system should be continued, and modified, if necessary, to suit the improved course of technical education." The motion was seconded and carried.

Mr. T. H. Court followed, agreeing with Mr. Smeaton as to necessity for qualification of masters. He agreed with the suggestion of a five years' term, believing that masters should not be too exacting as to length of term—that in many cases the indentures would be broken if a longer period were enforced.

Mr. P. I. Davies was of opinion that neither five nor seven years was of any use to learn the general routine of plumbing-work so as to turn a "sanitary plumber."

Mr. Arnold, of Lincoln, disagreed. In his opinion five years was quite sufficient. He personally had been bound seven years. After three years, becoming dissatisfied, he

"ran" three times, and was brought back; the fourth time he got away to Melbourne, where he immediately obtained work in a good shop at £5 a week. He argued, therefore, that the shorter period was ample for anybody who could become a good plumber.

(TO BE CONTINUED.)

Correspondence.

SEEK EXPERT ADVICE.

CHATHAM, ONT., November 13, 1884.

To the Editor of THE SANITARY ENGINEER:

AS THE inhabitants of our town are about agitating for a system of water-works, I have taken the liberty of troubling you for information, or for reference to some one who is expert in these matters, to whom we could refer. I inclose you map showing Chatham's situation. You will notice we have Lake Erie with a high bank to the south of us, and the River St. Clair and its diverging branches to the north of us. These last lie about five feet below the level of our town, while the lake bank is about fifty feet higher. The popular feeling, however, is against the lake water, and in favor of the River St. Clair, proposing to take the supply from the point marked "Baby's Point," distant about eighteen miles. Lake Erie is about twelve miles. We have a navigable river running directly through the town, but it is not available for anything but fire purposes. I suppose the Holly system and direct-pumpage would be required for the Baby Point scheme. Can you enlighten us as to the probable cost per mile for mains and size required? Chatham's population is 9,000.

Awaiting your pleasure, I am, sir,

Yours truly,

JOHN H. LUSCOMBE.

[The questions asked relate to interests too important to be intelligently treated in the columns of a paper. The authorities of Chatham require the services of an expert engineer familiar with water-works practice.

In this connection the editorial on another page, entitled "The Economy of Good Professional Advice," will be found suggestive.]

RANGE-BOILER FOR HEATING PURPOSES.

WILMINGTON, N. C., November 13, 1884.

To the Editor of THE SANITARY ENGINEER:

WILL you kindly advise me as to the practicability of warming a bath-room with a hot-water radiator connected with the range-boiler? The room is $7\frac{1}{2} \times 10$, with one window, and about forty feet from range. The south and east sides have outside exposure. Temperature is rarely below 30° , and not for any length of time. If it can be done any hints as to details will be gladly received.

Respectfully yours,

J. C. C.

[In our issue of November 13, page 555, is a description of how a plate-closet is warmed, in the manner you inquire about, in Mr. Cook's house, by a branch from the flow-pipe, between the water-back and boiler, the return from the coil entering the return from the boiler.

Not knowing what temperature you will be able to maintain both for the coil and the boiler, we can do little more than guess at the quantity of square feet of coil-surface you will require, but judge that from twenty to thirty will do, the former being sufficient if you can get a mean temperature of 180° Fah. in the coil. The coil should be continuous, with bends, and made of not less than 1-inch pipe, and the room it is to be placed in must be on a floor higher than the boiler. The flow-pipe must enter the coil at the top, where a pet-cock must be placed to withdraw air, or, what is better, if it is possible to run a small open pipe— $\frac{3}{8}$ -inch or $\frac{1}{4}$ -inch—to a height in the house, above which the water in the pipes cannot rise, and it will require no attention.

As to the capacity of your water-back to supply the heat required we cannot speak, but presume you can form some idea from the time, etc., it takes to warm the range-boiler.]

BOILER CIRCULATIONS.

FRIENDSHIP, N. Y., October 30, 1884.

To the Editor of THE SANITARY ENGINEER:

WILL you please advise me, through the columns of THE SANITARY ENGINEER, how to complete a perfect circulation of hot water by taking a lead pipe from top of boiler and returning to same? The boiler is connected to water-back of stove and supplied by tank overhead. I wish to take the hot-water pipe from top of boiler and connect to fixtures by means of as short a branch as possible, and return the main hot-water pipe to boiler to form a perfect and complete circulation, as to be able to draw hot water quickly at each fixture and constantly. Now, what I want to know is, where is the most advisable point to connect the return hot-water pipe to boiler to keep up a constant circulation of hot water—to connect at bottom of boiler and branch

from this to the bottom connection of water-back in stove, or leave this connection from bottom of boiler to bottom connection of water-back in stove entirely separate, and connect the return hot-water circulating pipe to the pipe that is connected from top connection of water-back in the stove to the side connection of the boiler?

What is the best means to prevent the hot water in a boiler from boiling? Is it by taking a pipe from top of boiler to top of tank in the garret, and turning the same just over the top of tank? Please advise me.

Respectfully, S. A. HANCOCK, Allegheny Co.

[First.—Run the hot-water pipe from the usual coupling at the head of the boiler to the highest faucet on the line of ample size, taking off the other faucets on the way; return in a pipe of about one-half the diameter of the rising pipe, and enter the heel of the return from the boiler to the water-back, just under the centre of the bottom of the boiler.

Second.—When you have the water from a boiler circulating through a system of pipes throughout the house, you can seldom get heat enough from the back to boil the water in the boiler; but a small open pipe from the top of the circulating line run to a height of two feet above the tank, then turned over into it, but not carried down sufficient to reach the water, will not only act as a vent for steam, but for air as well, and will also prevent collapse should the water be drawn from the boiler.]

ELECTRIC BELLS AND LIGHTING APPARATUS.

MONTREAL, November 22, 1884.

To the Editor of THE SANITARY ENGINEER:

WOULD you kindly inform me as to whether there is any reliable work published having reference to electric-bells and lighting? If so, where can I obtain the same, and the cost? If not, can you give me the address of some firm making a specialty of goods necessary for fixing above?

Yours very truly, JOHN DATE.

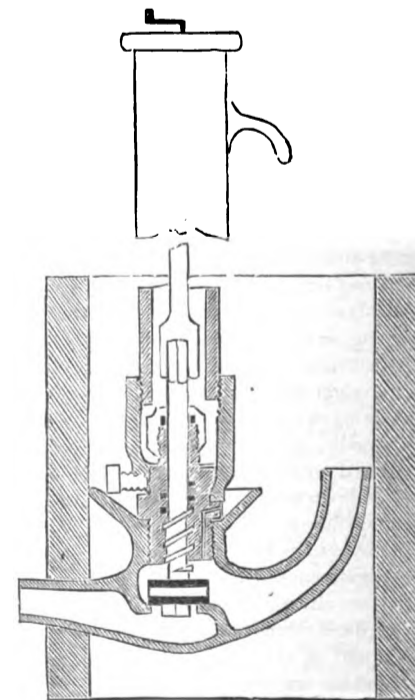
[Referred to our readers.]

Novelties.

Under this heading we propose to supplement our section of patents by descriptions and illustrations of new appliances put on the market. The selection will be made without reference to the wishes of agents or patentees, being governed solely by considerations of novelty, ingenuity, and probable interest to readers, and especially the fact that they have not been elsewhere described. As a rule we shall make no comments, and it is to be distinctly understood that a notice does not imply approval. No charge will be made for these notices, and any offer of pay for their insertion will insure their omission. We shall be glad to have our attention called to novelties suitable for this section.

HYDRANT.

WE illustrate here a hydrant or street-washer valve. It is intended to waste when shut off, and thus prevent freezing. The part containing the spindle or valve-stem is also



removable, to facilitate repairs, without the necessity of digging up. It is the invention of Messrs. H. Orbits & Willet, 229 Michigan Avenue, Detroit, Mich. A patent has been applied for.

NEW YORK STATE BOARD OF HEALTH.

THE New York State Board of Health held its quarterly meeting in this city November 21, under the presidency of Dr. E. M. Moore, of Rochester. Reports were received from the Committee on Vital Statistics, also from Mr. James T. Gardner, Director of the State Survey, on the bad condition of the Albany basin and threatened danger of serious sewage pollution of the water-supply of that city. The subject was laid over to the next meeting of the board.

The malaria at Rhinebeck was referred to the Sanitary Committee, and Dr. Woolsey Johnson, of that committee, with Mr. Gardner, will visit Rhinebeck and investigate the cause of the disease.

A resolution was passed calling the attention of the Governor of the State to the unsatisfactory condition of the buildings at quarantine in New York Harbor, which had already been considered at the cholera conference, with recommendation that the station be put in good order.

A special meeting of the board will be held at Albany December 15, to make estimates for appropriations for next year's work.

CONFERENCE ON MEASURES AGAINST CHOLERA.

ON call of Dr. William Smith, Health Officer of the Port of New York, a conference of health officers and physicians from several States was held at the rooms of the Board of Health of this city November 20. There were present, Dr. S. Oakley Vanderpoel, formerly Health Officer of this port; Hon. Erastus Brooks, of the New York State Board of Health; Dr. Samuel H. Durgin, President of the Boston Board of Health; Dr. Ezra Hunt, Secretary of the New Jersey State Board of Health; Dr. E. M. Moore, President of the New York State Board of Health; Dr. C. A. Lindsley, of the New Haven, Conn., Board of Health; Prof. Stephen Smith, New York State Commissioner of Lunacy; Dr. Thomas F. Rochester, of the University of Buffalo; Dr. W. T. Day, Sanitary Superintendent of the New York City Board of Health; Dr. E. H. Janes, Assistant Sanitary Superintendent; Dr. R. M. Wyckoff, of the Brooklyn Board of Health, and Drs. J. E. Richardson, W. H. Thayer, and J. F. Conkling, of Brooklyn, and Cyrus Edson, of New York.

Hon. Erastus Brooks presided, and Mr. Collins, of the New York City Board of Health, acted as secretary. Dr. William Smith presented the objects of the conference as (1) consideration of measures necessary to prevent the introduction of cholera into New York and neighboring communities; (2) consideration of measures to prevent extension of cholera, should it be introduced into the seaboard ports. After some discussion, it was concluded that action on the second of these objects properly belonged to the State boards and to the conference of State health officials, which will meet next month in Washington, and action of the New York body was confined to the first object, it finally taking shape in the adoption of the following resolutions:

"Resolved, That a vigilant quarantine of sanitation at our maritime quarantines ought to prevent the introduction of cholera.

"Resolved, That the following measures are necessary to secure a successful quarantine against cholera:

"First.—It is the duty of the general Government to provide at all foreign ports from which emigrants may embark a thorough sanitary inspection by a competent medical officer of persons, baggage, and cargo leaving such ports.

"Second.—The co-operation of the National Government, in so far as to require its representatives at foreign ports to prevent any infected cargo from being shipped, or to inform the quarantine authorities at the port of destination, in the most speedy manner possible, of any sickness on board of vessels at the place of departure of an infectious, contagious, or suspicious character, or of persons or cargo on board from cholera-infected localities.

"Third.—The co-operation of the general Government with the maritime quarantine by requiring its representatives to furnish bills of health to all vessels bound to ports in the United States, which bill of health shall give a full statement of the condition of the port with reference to the diseases of the character mentioned, of the crew and passengers on board, and of the measures taken to secure a good sanitary condition of the vessel while at the port of departure.

"Fourth.—The enactment of a law punishing masters of vessels who fail to bring United States Consuls' bills of health from ports where there is a representative of the

United States, and to compel, under penalty, the complete isolation of cases of the infectious or contagious diseases."

As it was stated that New York had not maintained in good repair the equipment at the quarantine station in the harbor of this city, the conference resolved that it was the duty of the State to maintain the efficiency of the quarantine, and make yearly appropriations for repair of the buildings and equipment, and give full power to the quarantine authorities to meet the dangers of cholera invasion by such appliances as science has found to be necessary.

The attention of railroads and transportation companies was called to the need of active measures to secure good sanitary condition of cars, stations, latrines, etc.

Copies of the resolutions concerning the introduction of cholera will be sent to the President of the United States, and will be brought before the conference of State Board of Health officials in Washington. The resolutions relating to the condition of the quarantine station at this port will be sent to the Governor of the State.

IMPROVEMENTS IN BUILDING.

In a paper entitled "Recent Improvements in Building," read before the Society of Arts, of Boston, Mass., Prof. T. M. Clark, of the Massachusetts Institute of Technology, considered that the "most important changes that had been introduced in regard to habits of construction were in the matter of protection against fire. Among those who had contributed to develop the art of building in a fire-proof manner, the officers of the Boston Manufacturers' Mutual Fire Insurance Company held the highest place, and many of the methods they advocated—such as plank floors, wire lathing, and automatic sprinklers—were coming into use for other than mill buildings; but the city of New York was in advance of the world in examples of the best fire-proof construction, principally on account of the power of the Board of Fire Underwriters, who controlled the rates on many millions of dollars of insurance, and were enabled to dictate in many cases how buildings should be constructed. The essence of a New York fire-proof building was a structure of protected iron-work in which the whole framework was cased in terra-cotta. Concretes had proved liable to crumble by fire and water, but a floor composed of hollow terra-cotta blocks, tapered so as to form a flat arch, and resting on the iron floor-beams, was much less expensive, as well as safer. The lower flange of the iron beam was protected by making the end blocks of such a shape as to come together under it. The roof of a New York fire-proof building was constructed in a very similar manner. With reference to basements in many parts of New York, water was more dreaded than fire, and in many cases the cellars went below the level of the ground water, in which case they were sometimes protected by being lined with felt soaked in Trinidad asphalt, while the floor was built as an inverted arch, and leveled up with concrete, to resist the hydrostatic pressure. Though this construction was expensive, it permitted of storing dry-goods and groceries even below the water-line."

In regard to the large apartment-houses now so common, the old-fashioned central court-yard had been discarded, and the best architects now considered it an indispensable condition that every room and bath-room should have at least one window opening into a space into which the sun shone and the wind blew. A system had been lately introduced, called the "duplex," in which the front of the building was entirely devoted to high-studded parlors, reception-rooms, and dining-rooms, while the rear was occupied by a greater number of stories of bedrooms. Another plan was to have alternate stories of high-studded rooms for parlors, etc., and low-studded bedrooms, each apartment thus comprising rooms on two floors, and with its own private staircase. This last arrangement was very economical of room. The most considerable advance in these houses would be in the direction of better ventilation. In the matter of plumbing, too, there had been improvement, the tendency being toward reducing the number of appliances and improving their quality. In regard to the drains outside the houses, the old-fashioned leaching cesspool was fast becoming a thing of the past, and was absolutely forbidden in some towns. In places without sewers the only alternative to the cesspool was the utilization of the sewage by subsoil irrigation, which had become quite common. The ordinary method of applying this system had been to provide the house with two drain-pipes, one for the liquid wastes, and the other for sewage which might contain solid matter, the former being carried through a Field's flush-tank, beyond which it was joined by the latter drain, the two then proceeding together to a tight brick settling-basin, and then by a 4-inch pipe to the irrigation ground, where a number of laterals, two inches in diameter, were thrown off and carried about twelve inches below the surface, laid with open joints, with collars fitting loosely. For ordinary dwelling-houses, from 500 to 1,000 feet of these laterals were put in, in lines three or four feet apart. This method had not proved satisfactory, and in his own practice Professor Clark had abandoned the flush-tank and substituted a tumbling tank, with a considerable saving in cost and in ease of cleansing, while the efficiency of the apparatus was not diminished. He had also omitted the collars usually put on the laterals, and had simply laid them end to end with an interval of a quarter of an inch, covered with a bit of paper. The expense of this method of disposing of house-wastes was not over \$100 for an ordinary dwelling, thus bringing it within the means of almost every

one. In fact, the cost of cleaning out a leaking cesspool would in a few years make that the more expensive contrivance of the two.

Finally, the speaker considered the Bower-Barff process of protecting iron from rust. The cost of this process had prevented its extensive use as yet, but it would no doubt be ere long extensively applied. The use of steel instead of iron for rolled beams was another novelty. American mills had been the first to offer a full assortment of steel beams, and the price was quoted the same as for iron beams, while in France iron beams were much cheaper than steel beams, which were just coming into the market. The unfavorable effect of shocks on steel, however, and the temptation for builders and manufacturers to add stiffness to the beams by increasing the proportion of carbon, thus lessening still more their power to withhold shocks, might render doubtful the advantage of substituting steel for iron.

MANUFACTURE OF GAS FROM OIL.

THE September number of the *Journal of the Society of Chemical Industry* contains an article by Dr. H. E. Armstrong on certain bye-products obtained in the manufacture of gas from oil, by the Pintsch system. The author states that during the compression of the Pintsch gas, under a pressure of about 10 atmospheres, liquid is deposited in a chamber attached to the pumps, and to a much larger extent in the reservoir in which the gas is stored previous to its being transferred to the portable drums or cylinders. This liquid is commonly called "hydrocarbon." Considerable tar is also deposited from the gas during its manufacture.

The "hydrocarbon" is practically free from paraffines, and consists of benzene and toluene, together with members of the olefine and acetylene series.

The author describes the Pintsch process, which consists in decomposing oil by passing it into retorts kept at a bright cherry-red heat. About 80 feet of gas are obtained from a gallon of oil. The quantity of gas seems to depend more upon the temperature than upon the quality of oil used.

The quantity of "hydrocarbon" deposited is rather less than one gallon per 1,000 feet of gas compressed, but varies with the season. The amount of tar produced averages about five gallons per 1,000 feet of gas.

The author also describes the Keith process, which is similar to the Pintsch system. It is stated that from 100 to 150 feet of gas may be obtained from one gallon of oil, and Mr. Keith attaches much importance to the quality of the oil used.

After considering the chemical nature of the "hydrocarbon," the author says in conclusion that "the time must come when coal-tar will not be regarded as a mere bye-product, and when attention will be paid not only to the manufacture of gas, but also of coke and of particular constituents of coal-tar; when, in short, the materials latent in coal will be progressively utilized. It may be that then the coal will first be coked, the oil which distills over being carefully condensed, and that the 'weak gas' thereby produced will be utilized as fuel; at the same time the ammonia and sulphur will be recovered. The paraffine and whatever else of immediate value it may contain having been separated from the oil, the residue will be utilized in the production of oil-gas, and of benzene, anthracene, etc." Dr. Armstrong thinks that it will be better to have a single set of mains for the supply of gas, both for lighting and heating purposes, than two sets of mains, as suggested by the late Dr. Siemens, one for illuminating-gas and the second for fuel-gas.

DAVID BABCOCK, a contractor of this city, died, November 12, in the sixty-second year of his age. His first contract was to furnish the stone for constructing the old tunnel in Brooklyn, beginning at the South Ferry and extending about half a mile, through which the Long Island Railroad passed. Mr. Babcock afterward took the contract for filling in the Battery and furnishing the stonework for the wall which bounds the lower end of Manhattan Island.

DURING the year ending October 18, 1884, 1,497 patients were treated in St. Luke's Hospital, New York City. Of these 601 were discharged cured, 483 improved, and 126 unimproved; 129 died, and 158 were still under treatment. All but 397 were charity patients, and the average daily cost per capita was \$1.21. The hospital authorities rejected for various causes 438 applications for admission. The total hospital expenses were \$70,201. The legacies received during the year amounted to \$38,823, and \$26,000 was given to the hospital for the endowment of free beds.

REPORT OF MORTALITY IN CITIES OF THE UNITED STATES FOR THE WEEK ENDING NOVEMBER 15, 1884.
(COMPILED FROM DATA FURNISHED BY THE NATIONAL AND LOCAL BOARDS OF HEALTH.)

CITIES.		Total Population.	Total Number of Deaths.	Representing an annual death rate per 1,000 of—	Number of Deaths under 5 years.	Percentage of Deaths under 5 years to total Deaths.	Accidents.	Cerebro-spinal Meningitis.	Consumption.	Croup.	Diarrheal Diseases.	Diphtheria.	Erysipelas.	FEVER.			ACUTE LUNG DISEASES.				Measles.	Puerperal Diseases.	Small-pox.	Whooping- cough.																						
														Typhoid.	Malarial.	Scarlet.	Pneumonia.	Congestion of Lungs.	Bronchitis, acute.	Pleurisy.																										
NORTH ATLANTIC CITIES.																																														
Portland	Maine	35,000	9	13.3					2																																					
Boston	Mass.	435,000	215	25.7	71	32.9	7		33	3	2	7		9		10	26	1	17		1	2		4																						
Lowell	Mass.	71,500	24	17.4	7	29.1		1	3			1						1																												
Worcester	Mass.	69,000	21	15.8	4	19.0							1				1				1																									
Fall River	Mass.	67,000	20	15.5	9	45.0			2	1	1			1			2				2	1																								
New Haven	Conn.	69,500	29	21.7	7	24.1			6	1		1		1			2																													
Providence	R. I.	125,000	46	19.1	13	28.2	3	1	5			3		3		2	2	1	3			1																								
Total		872,000	364	21.7	111	30.4	10	2	52	6	3	12	1	14		12	33	3	21		4	4		4																						
EASTERN CITIES.																																														
Albany	New York	103,000	34	17.1	6	17.6	1		12	1	2						4																													
New York	New York	1,355,000	659	25.3	262	39.7	25	4	111	28	15	41	1	11	5	8	74		44		15	5		8																						
Brooklyn	New York																																													
Hudson County	New Jersey	225,000	97	23.4	29	29.8	1	2	12	2	6	4		4	2	6	12		2	1		3		1																						
Newark	New Jersey	154,000	76	25.7			3	2	12	2	4	7		4	1	1	5		1																											
Philadelphia	Pa.	940,000	394	21.8	139	35.2	17		55	27	6	26	1	16	1	11	31	1	5		2			3																						
Wilmington	Delaware																																													
Total		2,777,000	1,260	23.6	436	36.8	47	8	202	60	33	78	2	35	9	26	126	1	52	1	17	8		12																						
LAKE CITIES.																																														
Buffalo	New York																																													
Rochester	New York	105,000	30	14.8	9	30.0		2	3	2	6	2		1			2	1	3	1																										
Cleveland	Ohio	210,000	80	19.8	42	52.5	2		10	1	2	4		6	1	2	2		1		12			1																						
Detroit	Michigan	146,000	41	15.2	20	48.7			5			8		1	1		5		1																											
Chicago	Illinois	650,000	222	17.7	92	41.4	9	4	24	13	6	22	1	8	1	7	13	3	15		2	5		2																						
Milwaukee	Wisconsin	147,000	50	17.7	27	54.0	1		4	2	2	2		1			2	2	5					2																						
Total		1,252,000	423	17.6	190	44.9	12	6	46	18	16	38	1	17	3	9	24	6	25	1	14	5																								
RIVER CITIES.																																														
Pittsburg	Pa.	210,000	79	19.5	27	34.1	4		5	1	2	12		5	1		11	1	4		1	2																								
Cincinnati	Ohio	275,600	123	23.2	50	40.6	6	1	19	3	11	2		4		3	14	1	2		6																									
Louisville	Ky.	137,000	61	23.1	11	18.0		3	5	2	6	2		9		1	5		1																											
Indianapolis	Ind.	94,000	45	24.9	9	20.0		1	14		2			3	2		1																													
Minneapolis	Minn.	100,000	16	8.3	10	62.5		1	1	1	1	4					1		1																											
Evansville	Ind.	34,000	27	41.3	11	40.7		1	1	1	2	6		4																																
Kansas City	Mo.	75,000	15	10.4	7	46.6	1		2	1				1	1		1																													
St. Louis	Mo.	375,000	160	22.2	59	36.8	2		18	8	9	17		6	9	4	10	3	2		1	2		1																						
Total		1,300,600	526	21.0	184	34.9	13	7	65	17	33	43		32	13	8	43	5	10		8	5		1																						
SOUTHERN CITIES.																																														
District of Columbia	Wh.	133,800	46	17.9	11	23.9	3		10	1	1	2		3	1		2	1	1																											
"	Col.	60,300	32	24.0	9	28.1	2		10			2		1	1		2		1																											
Richmond	Va.	41,000	17	21.6	3	17.6	1		1	2							1		1																											
"	Col.	32,400	19	30.5	8	42.1	1		3				1				2	2	1																											
Charleston	S. C.	25,000	11	22.9	1	9.0	1		1								1																													
"	Col.	27,800	18	33.7	8	44.4			2		3						1		1			1																								
Atlanta	Geo.																																													
"	Wh.																																													
"	Col.																																													
Augusta	Geo.																																													
"	Wh.																																													
"	Col.																																													
Savannah	Geo.																																													
"	Wh.																																													
"	Col.																																													
Nashville	Tenn.	35,100	14	20.7	3	21.4	2		2	1	3	1			1																															
"	Col.	21,300	4	9.7	2	50.0			1	1		1					1																													
New Orleans	La.	171,000	89	27.1	21	23.5	6		16	3	6	3			5		1		2	1				1																						
"	Col.	63,000	49	40.5	15	30.6	2		9	2	2	2			3		5																													
Total White		405,900	177	22.7	30	22.0	13		30	7	10	6		3	7		5	1	3	1				1																						
Total Colored		213,800	122	29.7	42	34.4	5		25	3	5	5		1	1	4	12	2	3		1			1																						
Total in 30 U. S. Cities		6,821,300	2,922	22.3	1,002	35.2	100	23	420	111	100	182	5	102	36	55	243	18	114	3	43	23		24																						
November 1. Total in 28 English Cities																								8,762,354	3,464	20.6			100				84	31		67		66								
"	1.	"	8 Scottish Cities	1,254,607	543	22.5					23	20		12		25		112			57		24	50																						
"	1.	"	16 Irish Cities	858,660	329	19.9				35		17		6		23		58			14			22																						
"	1.	"	15 Swiss Cities	455,537	151	17.2				14		13						10						5																						
May 31.	"	"	164 German Cities	8,630,318	4,013	24.2		1,913		643	17	354	148		38		61		443		42	14	3	45																						
June 7.	"	169	"	8,906,936	4,398	25.7		2,134		655	37	420	160		46		60		477		74	16	2	47																						
" 14.	"	167	"	8,798,991	4,131	24.7		2,056		615	25	411	120		34		48		447		66	13	1																							

Notes and Abstracts.

All reports or communications intended for this column, or especially for the statistical department of this journal, should be addressed to THE SANITARY ENGINEER, Box 578, Washington, D. C.

Registrars will please notify Box 578, Washington, D. C., when their supply of blank Postals is running low, in order that they may be kept supplied.

The populations in this table are estimated to the middle of the ninth half-year from the date of the taking of the last census—that is, to September 1, 1884.

During the week ending November 15, 1884, in 30 cities of the United States, having an aggregate population of 6,821,300, there were 2,922 deaths, which is equivalent to an annual death-rate of 22.3 per 1,000. The rate in the North Atlantic cities was 21.7; in the Eastern cities 23.6; in the Lake cities 17.6; in the River cities 21.0; and in the Southern cities for the whites 22.7 and for the colored 20.7 per 1,000.

Accidents caused 3.4, consumption 14.3, croup 3.7 and diarrheal diseases 3.4 per cent. of the deaths. The mortality from diphtheria has slightly diminished, having caused 6.2 per cent. of the deaths, against 7.0 for the previous week, and 5.1 for the corresponding week last year. In the Eastern cities it caused 6.1, in the Lake 8.9, in the River 8.1, and in the Southern cities among the colored 4.0 per cent. of the deaths. Croup also showed a diminished mortality, the percentage being 3.7, against 4.2 for the previous week. In the Eastern cities it caused 4.7 and in the Lake 4.2 per cent. of the total mortality. To typhoid fever were attributed 3.4 per cent. of the deaths, the highest percentage being 6.0 in the River cities, 4.0 in the Lake, and 3.8 in the

North Atlantic. Malarial fevers caused 1.2, scarlet fever 1.8, pneumonia 8.3, bronchitis 3.9, measles 1.1, puerperal diseases 0.7, and whooping-cough 0.8 per cent. of the deaths. The mortality from consumption was greatest in the Southern cities, where it caused 16.9 per cent. of the deaths among the whites and 20.4 among the colored.

CLEVELAND, O.—Dr. G. H. Ashmun reports measles to be epidemic, there being about 1,000 cases under treatment November 15.

BOSTON, MASS.—C. E. Davis, Jr., reports 61 new cases of scarlet fever, 20 of diphtheria, and 32 of typhoid fever.

DETROIT, MICH.—Dr. O. W. Wight reports 2 new cases of scarlet fever and 31 of diphtheria.

MILWAUKEE, WIS.—Dr. E. W. Diercks reports 5 cases of diphtheria and 23 of scarlet fever under treatment November 15.

BALTIMORE, MD.—The report of the Board of Health for the week ending November 15 records 133 deaths, of which 42 were under 5 years of age. The annual death-rate for the whole population was 16.90 per 1,000, or 5.04 for the whites and 27.73 for the colored. Diphtheria caused 4 deaths, croup 2, measles 1, whooping-cough 3, typhoid fever 2, malarial fevers 5, diarrheal diseases 7, consumption 21, acute lung diseases 11, and violence 5.

MASSACHUSETTS.—The return from 94 cities and towns of the State, for the week ending November 8, having an aggregate population of 1,087,616, gives 473 deaths, which is equivalent to an annual death-rate of 22.6 per 1,000. The highest rates recorded were 27.3 in Fall River and 27.2 in Holyoke. The principal infectious

diseases caused 91 deaths, among which were, diphtheria and croup 41, diarrheal diseases 16, typhoid fever 14, scarlet fever 10, measles and whooping-cough 1 each.

RICHMOND, VA.—During the month of October there were reported 161 deaths, which is the same number reported for the corresponding month last year. Of the decedents 68 were white and 93 colored. The annual death-rate for the whole population was 25.76 per 1,000, or 19.42 for the whites and 33.81 for the colored. Scarlet fever caused 1 death, typhoid fever 8, malarial fevers 5, whooping-cough 2, croup 1, diarrheal diseases 14, consumption 19, acute lung diseases 9, and violence 5.

CHICAGO, ILL.—Dr. M. K. Gleason in his report for October records 910 deaths, which is 102 less than in September, but 70 more than in the corresponding month last year. The death-rate was 16.0 per 1,000 annually. Of the decedents 443 were under 5 years of age. Diphtheria caused 70 deaths, croup 34, scarlet fever 20, measles 1, whooping-cough 11, typhoid fever 39, malarial fever 9, diarrheal diseases 105, consumption 76, acute lung diseases 70, puerperal diseases 13, and violence 64.

DETROIT, MICH.—The report of the Health Officer for October gives 265 deaths, an annual death-rate of 22.2 per 1,000. Diphtheria caused 34 deaths, croup 8, scarlet fever 1, whooping-cough 1, typhoid fever 11, malarial fevers 16, diarrheal diseases 27, consumption 20, acute lung diseases 11, and violence 5.

MILWAUKEE, WIS.—During the month of October there were 245 deaths, equivalent to an annual death-rate of 19.6 per 1,000. Diphtheria caused 6 deaths, croup 5, measles 2, scarlet fever 6, typhoid fever 7, whooping-cough 1, diarrheal diseases 46, consumption 18, acute lung diseases 15, and violence 6.

ENGLAND.—The report of the Registrar-General for the week ending November 1 gives the annual death-rate in the 28 large towns of England and Wales as 20.6 per 1,000. The highest rate was in Preston, 28.5; the lowest in Norwich, 15.0. The 31 deaths

whooping-cough 2, fever 3, diarrhoea 3, acute lung diseases 17, and violence 3.

Glasgow.—Deaths, 266; annual death-rate 26.7 per 1,000. Measles caused 8 deaths, scarlet fever 17, diphtheria 12, whooping-cough 9, fever 8, diarrhoea 5, acute lung diseases 56, and violence 8.

IRELAND.—The average annual death-rate in the 16 principal town districts for the week ending November 1 was 19.9 per 1,000.

Dublin.—Deaths, 165; annual death-rate, 24.4 per 1,000. Scarlet fever caused 10 deaths, typhus fever 3, whooping-cough 2, typhoid fever 5, diarrhoea 4, consumption 20, acute lung diseases 24, and violence 5. At the close of the week there were under treatment in the hospitals 66 cases of scarlet fever, 27 of typhus fever, and 14 of typhoid fever.

Belfast.—Deaths, 64; annual death-rate, 15.4 per 1,000. Scarlet fever caused 7 deaths, typhus fever 1, whooping-cough 2, diarrhoea 6, consumption 9, and acute lung diseases 12.

FRANCE—Paris.—During the week ending November 6, there were 1,006 deaths, against 989 for the previous week. The annual death-rate was 23.35 per 1,000. Typhoid fever caused 20 deaths, measles 35, diphtheria 34, small-pox 1, scarlet fever 3, whooping-cough 4, diarrhoeal diseases 68, consumption 218, bronchitis and pneumonia 77. On the 7th there were several cases of cholera reported, but up to that date no deaths.

Rheims.—Week ending November 1: Deaths, 37; annual death-rate, 20.5 per 1,000. Typhoid fever caused 1 death, diarrhoeal diseases 7, consumption 3, acute lung diseases 5, and violence 5.

BELGIUM—Brussels.—October 19-25: Deaths, 173; annual death-rate, 21.0 per 1,000. Small-pox caused 1 death, scarlet fever 1, typhoid fever 6, diphtheria 1, croup 1, whooping-cough 1, diarrhoeal diseases 18, bronchitis and pneumonia 15, consumption 25, and violence 1.

GERMANY—Dresden.—October 19-25. Deaths, 98; annual death-rate, 21.6 per 1,000. Diphtheria caused 9 deaths, whooping-cough, scarlet fever, and typhoid fever 1 each, measles 2, diarrhoea 4, consumption 16, and violence 3.

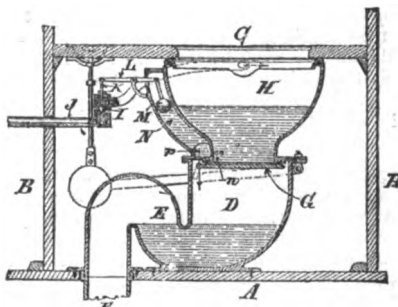
RUSSIA—St. Petersburg.—October 12-18: Deaths, 394; annual death-rate, 22.1. Measles caused 1 death, scarlet fever 4, typhoid fever 8, diphtheria 18, whooping-cough 2, diarrhoeal diseases 52, and acute lung diseases 42.

DENMARK—Copenhagen.—October 22-28: Deaths, 101; death-rate, 19.7. Measles caused 13 deaths, scarlet fever 1, diphtheria 2, typhoid fever 1, diarrhoeal diseases 8, consumption 13, acute lung diseases 10, and violence 1. During the week there were reported 310 new cases of measles, 18 of scarlet fever, 7 of diphtheria, and 13 of typhoid fever.

American Patents.

It is our purpose to give in these columns every Patent granted in the United States for fixtures and appliances used in Plumbing, Sewerage, Gas-Fitting and Gas Manufacture, Steam and Hot-Water Heating, Electric-Lighting Apparatus, etc. This is done for the information of our readers, and not as an advertisement of the articles patented. Printed specifications of any Patents here mentioned, together with full detail illustrations, will be sent on receipt of twenty-five cents.

800,905. WATER-CLOSET. James Semple, Cincinnati, Ohio. Filed June 18, 1883. (No model.) Issued June 24, 1884.



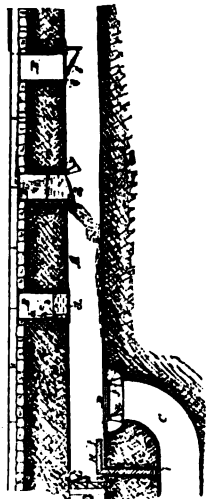
Claim.—1. The combination of a bowl, H, float-chamber N, and auxiliary trap P P', the bowl communicating at or near its bottom with the lower end of the float-chamber, the lower end of the float-chamber communicating with the auxiliary trap, and the auxiliary trap being closed at top and constructed to discharge into the hopper, as set forth.

2. The combination of a bowl, a float-chamber having a groove, n', and an auxiliary trap, the float-chamber communicating at its lower end with the bowl and auxiliary trap, and its groove located in a position to indicate the height of the overflow of the auxiliary trap, as set forth.

801,280. VENTILATING SEWERS. William M. Green, Chicago, Ill., assignor to the Exhaust Ventilator Company, same place. Filed June 7, 1883. (No model.) Issued July 1, 1884.

Claim.—1. The combination, with a sewer, of an exhaust apparatus at the outer end thereof, and gates arranged at the mouths of the sewer-inlets communicating with the top of the sewer, constructed to open au-

tomatically for the passage of fluid, and to close after the same has been discharged into the sewer without obstructing the flow of liquid through the same, substantially as set forth.

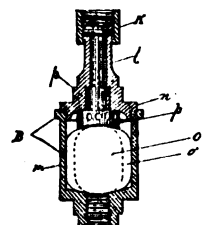


2. The combination of the sewer, exhaust apparatus, discharge branch arranged at the rear of said apparatus, self opening and closing gates at the mouths of the inlets, and an automatic gate at the mouth of the branch, substantially as specified.

3. The combination, in the gate D, of the series of sections independently hinged, and weighted or counterbalanced to different degrees, for the purpose specified.

4. The combination, with the sewer discharge branch and exhaust apparatus, of a self-closing gate, H, arranged between the branch and mouth of the sewer, to prevent the passage of water to the exhaust apparatus, substantially as and for the purpose set forth.

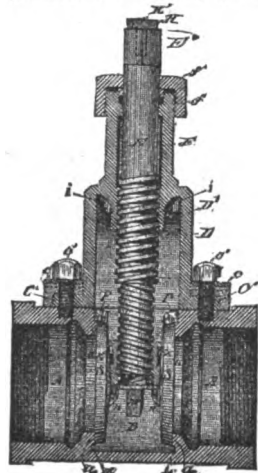
801,124. DEVICE FOR PREVENTING PERCUSSION OR WATER-HAMMERING IN PIPES. Francis Hyde, Toronto, Ontario, Canada. Filed July 5, 1883. (No model.) Issued July 1, 1884.



Claim.—1. A percussion-chamber, B, provided with a compression-ball, o, having longitudinal conduits o' in the periphery thereof, and placed in the chamber proper, m, having a cover, n, combined with vessel p, having orifices p', as shown and described, and operating as set forth.

2. A percussion-chamber, B, constructed with a compression-ball, o, acting in combination with taps or valves in water-pipes under a pressure, substantially as specified and described.

801,267. STRAIGHT-WAY VALVE. Sidney W. Hoag, Sr., New York, N. Y. Filed November 5, 1883. (No model.) Issued July 1, 1884.



Claim.—1. In a straight-way valve, the combination, with valve-disks connected to a supporting-block by an attachment permitting an independent movement of the disks and block, and a valve-stem and screw actuating the block to produce a slight movement of the disks to and from their seats in line parallel therewith, of a locking device adapted to lock the disks and block immovably together during the sliding movement of the valves and release them when in register with their seats, substantially in the manner and for the purpose herein set forth.

2. The combination, with the sliding disks in a straight-way valve, and with a threaded valve-stem for operating the same, of a tapering or wedge-shaped block or nut interposed between the disks to bear against inclined surfaces thereon, and connected thereto by an attachment permitting a slight independent movement of the block and disks, substantially in the manner and for the purpose herein set forth.

3. The combination, in a straight-way valve, with a valve-seat having a projecting rim, of a valve-disk moving over the same, having a lug or flange upon its periphery adapted to overlap the projecting rim of the valve-seat, substantially in the manner and for the purpose herein set forth.

4. The combination, with the casing inclosing the valve-chamber in a straight-way valve, its valve-stem, and valve-disks, of a lip or flange upon the periphery of each disk, adapted to bear against and slide upon the side of the casing parallel with the face of the valve-seat, substantially in the manner and for the purpose herein set forth.

5. The combination, in a straight-way valve, with its valve-stem or screw, its valve-disks, and its valve-seats, of a projecting stop lip or flange upon the periphery of each disk, adapted to overlap and engage the rim of the valve-seat when the disk is superimposed thereon, substantially in the manner and for the purpose herein set forth.

6. The combination, in a straight-way valve, with its valve-chamber and bonnet, of a re-enforcing flange formed upon said valve-chamber tangential thereto, and recessed to receive and partially embrace a counterpart flange upon the bonnet, substantially in the manner and for the purpose herein set forth.

7. The combination of the valve-chamber having a surrounding flange and the bonnet having a similar surrounding flange with clamps which surround the said flanges, whereby a tight joint is formed, substantially in the manner and for the purpose herein set forth.

800,848. FIRE-ESCAPE. Jesse H. Burks, Los Angeles, Cal., assignor to Welcome A. Botkin, Eldridge W. Brannan, John J. O'Brien, Frank B. Hough, Salathiel C. Fancher, and William S. Brown, all of Kansas City, Mo. Filed January 23, 1884. (No model.) Issued June 24, 1884.

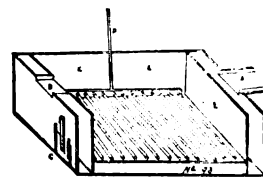
800,857. FIRE-ESCAPE. Lewis J. Evans, New York, N. Y. Filed May 16, 1883. (No model.) Issued June 24, 1884.

800,861. CONSTRUCTION OF BUILDINGS. Edwin Gilbert, Georgetown, Conn., assignor of two-thirds to Henry L. Hoyt, Norwalk, Conn., and Solomon J. Gordon, Springfield, Mass. Filed December 26, 1883. (No model.) Issued June 24, 1884.

800,870. DRAIN-CLEANER. George Washington Immel, Logansport, Ind. Filed March 14, 1884. (No model.) Issued June 24, 1884.

English Patents.

98. PURIFYING SEWAGE AND FOUL WATERS.

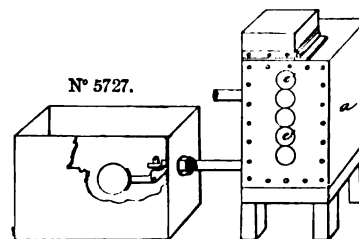


This invention consists of an improved method and apparatus for filtering, aerating, oxygenating, and purifying foul waters.

Samuel Chapin Dean, of No. 39 Bramber Road, Fulham, London, S. W.

Prov. spec. January 1, 1884. Complete spec. July 3, 1884. (Price 6d.)

5,727. IMPROVEMENTS IN APPARATUS FOR MEASURING WATER AND OTHER LIQUIDS.

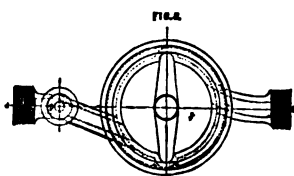
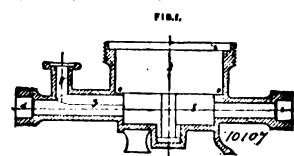


This invention relates to the construction of an improved meter or apparatus for measuring water, the object of the invention being to provide a meter which will measure with accuracy, and which is simple in construction and not liable to get out of order.

William Henry Tooth, of Dante Road, Newington Butts, in the county of Surrey.

Prov. spec. December 13, 1883. Letters patented June 14, 1884. (Price 6d.)

10,107. IMPROVEMENTS IN APPARATUS FOR MEASURING WATER OR OTHER LIQUIDS. Communicated from abroad by Anton Carl Spanner, of Vienna, Austria.



This invention relates to apparatus for measuring water or other liquids, and comprises improvements in the construction of the casings of water-meters and in the adaptation of the said casings to receive two different kinds of mechanism. It further comprises the improvements described in the specification.

William Robert Lake, Southampton Buildings, in the county of Middlesex.

Com. spec. July 12, 1884. (Price 4d.)

Association News.

BALTIMORE MASTER PLUMBERS.—The association met November 13, President William H. Rothrock in the chair, James Millar secretary. There was a fair attendance of members. After the transaction of regular business the election of a recording secretary was called for, but no election was held. Some of the members tried to prevail on Mr. Millar to accept a unanimous election for the position, but he declined. The committee appointed to revise the regulations for the official inspection of plumbing, to be submitted to the Health Commissioner, reported progress.

CHICAGO MASTER PLUMBERS.—The association met November 19, President E. Baggott in the chair. Mr. John Reid, of the J. L. Mott Iron-Works, New York, was introduced, as also his associate, Mr. Wolcott, and the former made a pleasant address. He announced that his business in Chicago was to arrange for the establishment of a branch house in that city, the establishment of which he hoped would be to the mutual advantage of the Chicago plumbers and his firm. Recognizing the value of the co-operation of plumbers, he said: "Notwithstanding the education and ability of architects, their work could only be complete when they took into their confidence and full co-operation a thoroughly practical plumber."

This was a reform the speaker desired to see, and would do all in his power to promote. Mr. Alexander Murray announced a gift of \$100 from the Crane Brothers Manufacturing Company, whereupon Mr. Reid donated \$200, to be expended for the library or as the association thought fit. To both donors cordial thanks were voted. Mr. Alexander Murray said: "In accepting these gifts that shall so advance the intellectuality of our trade, we do it in a reciprocal spirit. We, as plumbers, become better educated by perusing works that appertain to our interests; we will correspondingly increase and advance the interests of the manufacturers. If we convince a villager that his life depends on having a suitable supply of pure water, we add to the bank account of the manufacturer. If we convince that villager that sewage and waste-water ought to be carried away from his dwelling, we add to the manufacturers' orders and profits. And so I trust in accepting these gifts that, as I said in the beginning, this will be the harbinger of a new order in our relation with the manufacturing companies." Mr. Murray, from the Committee on Addressing the Association of Western Architects, read from the address printed in THE SANITARY ENGINEER last week. It was determined to take immediate steps to fit up the exhibit. Important developments, it was intimated, might be expected soon from the Building Committee. The Sanitary Committee, through Mr. Bain, repeated its former indorsement of salt-glazed sewer-pipe. The report was not acted on, except to be placed on the minutes. Secretary William B. Oliphant read a letter and extracts from the *Sanitary World*, of London, showing that English plumbers assemble together and discuss live subjects. Health Commissioner De Wolf was asked for a lecture, and President Baggott was made a Committee on Arrangements. James McLaughlin, of 742 Forty-third Street, was elected a member. A private session, as usual, closed the meeting, which was exceptionally well attended.

NEW ORLEANS AUXILIARY SANITARY ASSOCIATION.—At a meeting of the Executive Committee, Nov. 13, President Fenner stated that the society had been of great service in assisting the City Board of Health to stamp out small-pox. Nearly \$5,000 had been expended by the society in maintaining the corps of inspectors which had acted under the direction of the board of health. In all about \$18,000 had been expended by the society. A committee will act with the Building Committee of the World's Exposition in relation to the sanitation of the buildings and grounds. The sanitary director of the association reports the health of the city as good.

Notes.

CONSTRUCTION.

NEWARK, N. J.—Proposals for constructing the sewer from Peddie Street to Newark Bay were opened by the Sewers and Drainage Committee November 20. The work is in five sections, as follows: Section 1, 7,800 lineal feet of sewer; section 2, 6,350 lineal feet of sewer; section 3, 340 lineal feet of sewer, 40x70 feet of foundations; section 4, 9,500

lineal feet of timber conduit; section 5, 2,000 lineal feet of timber conduit. The aggregates of the bids are as follows: B. M. & J. F. Shanley, sections 1 to 5, \$299,964.92; James Smith, 1 to 5, \$313,662; Thomas McGrath, 1, 2 and 3, \$214,337.20; James Smith, 1, 2 and 3, \$204,706; B. M. & J. F. Shanley, 1, 2 and 3, \$200,235.45; Ross & Sandford, 4 and 5, \$101,178.33; James Smith, 4 and 5, \$108,956; B. M. & J. F. Shanley, 4 and 5, \$99,729.47; Miles Tierney, 2 and 3, \$131,597; James Smith, 2 and 3, \$132,931; B. M. & J. F. Shanley, 2 and 3, \$130,660.55; Thomas McGrath, 2 and 3, \$144,375.70. The contract will be awarded to B. M. & J. F. Shanley.

PITTSBURG, PA.—At the meeting of the Water Committee of this city, November 18, the contract for furnishing 300 tons of 24-inch and 180 tons of 30-inch water-pipe was awarded to A. H. McNeal, of Burlington, N. J., at \$24.41 per ton, subject to the approval of city councils, which meet the first Monday in December. The other bidders were the Cincinnati & Newport Iron and Pipe Co., Newport, Kentucky, \$27.48 per ton; Warren Foundry and Machine Co., Phillipsburg, N. J., \$28; Dennis, Long & Co., Louisville, Ky., \$38; and R. D. Wood & Co., Philadelphia, \$28.20. The contract for laying the pipe was awarded to Booth & Flynn, of this city, for \$11.85 per foot for pipe laid under the Monongahela River and \$1.24 per foot for pipe laid on land.

SYRACUSE, N. Y.—The stone and brick work for the foundation and basement of the new federal building was completed November 15. The contract for the superstructure has not yet been let, but Architect Merrick expects to hear from Washington every day that it has been awarded. The stone for the rest of the building will be got out and cut this winter, so that the work can be pushed early next spring.

ALBANY, N. Y.—The Aldermen adopted resolutions, November 17, requesting the Water Commissioners to furnish to the board a detailed statement of the information received by them in previous investigations, with their reasons for adopting the plan of pumping a supply from the river instead of obtaining the same from other sources.

BROOKLYN, N. Y.—At a meeting of the Common Council Committee on Water and Drainage, November 14, an appropriation of \$500,000 for the acquisition of property necessary to extend the water-works from Rockville Centre to Massapigua Pond was considered. After the land and water rights are obtained, the cost of the works will be about \$2,000,000.

BROOKLYN, N. Y.—The Common Council, November 17, postponed for one week resolutions that the Mayor, Comptroller, and City Clerk be authorized to borrow \$955,000 on bonds of the city for construction of the main relief-sewer, and that the Commissioner of City Works proceed to construct the sewers according to the plans of the office.

UTICA, N. Y.—The Water Company is negotiating for the purchase of land just south of the present reservoir on Golden Farm, on which to erect a new reservoir of about 500,000,000 gallons capacity. The estimated cost of the improvement is \$100,000.

BROOKLYN, N. Y.—The Board of Supervisors voted on November 20 to award the first prize for plans for the proposed Hall of Records to that known as "Plan No. 2," and that said plan be adopted for the building and a contract be made for the working drawings and specifications and for superintendence with the author of the plans.

ST. PAUL, MINN.—The plans submitted by the City Engineer for a bridge across the Mississippi River have been accepted by Council, and he has been directed to prepare specifications. The completed bridge must not cost more than \$200,000.

ASBURY PARK, N. J.—The committee recently appointed on obtaining a supply of water for fire and domestic uses reported November 18 in favor of obtaining it from artesian wells, and recommends appointing a committee to secure the necessary legislation to that end.

PHILADELPHIA.—The contract for the outward pavilion of the municipal hospital was awarded November 21 by the Board of Health to James Bradley at \$6,637.27.

NEW YORK.—Controller Grant and Chamberlain Laidlaw reported, November 21, to the Commissioners of the Sinking Fund that they had examined the plans and specifications for an armory for the Twelfth Regiment and found them satisfactory. The site, which is at Sixty-first Street and Ninth Avenue, will cost \$208,000, and

perfecting the title \$1,305.08 more. The building will cost \$290,694.92, making the total cost of the armory \$500,000.

BROOKLYN.—Proposals were opened November 18 for constructing a sewer in Vernon Avenue, as follows: James F. Gillen, 24-inch pipe, \$2.25 per foot; 18-inch pipe, \$1.95 per foot; manholes, \$40 each; sureties, James T. Carey and Patrick Farrell. Owen Mulvey, 24-inch pipe, \$2.35 per foot; 18-inch pipe, \$1.75 per foot; manholes, \$40 each; sureties, A. A. Nolan and Francis J. York. Henry Monk, 24-inch pipe, \$2.19 per foot; 18-inch pipe, \$1.85 per foot; manholes, \$36 each.

MUNCIE, IND.—Plans have been completed by architect B. S. Tolan, of Fort Wayne, for a court-house to cost \$200,000. The contract for the superstructure has been let to Charles Pierce, of Indianapolis. The building will be of stone and fire-proof.

LAKE VIEW, ILL.—Bids for pumping-works for town of Lake View, Cook Co., Ill., were opened November 16 as follows: The Gordon & Maxwell Co., Hamilton, O.—Proposition No. 1: Direct-acting isochronal; capacity, 5,000,000; duty, 65,000,000; size, 26 and 45x21x36; price, \$19,000. Proposition No. 2: Direct-acting duplex; capacity, 5,000,000; duty, 60,000,000; size, 26 and 45x21x36; price, \$16,000. Proposition No. 3: Direct-acting duplex; capacity, 5,000,000; duty, 60,000,000; size, 24 and 45x21x24; price, \$13,000. Proposition No. 4: Direct-acting isochronal; capacity, 8,000,000; two pairs engines; size, 20x40x17, 1—2x36; duty, 65,000,000; price, \$27,000; one pair of these machines, \$14,000. Proposition No. 5: Direct-acting duplex; capacity, 5,000,000; duty, 60,000,000; size, 18 and 31x15x30; price, \$14,000. Proposition No. 6: Crank and fly-wheel vertical-beam engines, two machines; capacity, 5,000,000; duty, 95,000,000; size, 16 and 32x15x30; price, \$19,500; one of these machines, \$10,500. Proposition No. 7: Crank and fly-wheel vertical-beam engines, two machines; capacity, 5,000,000; duty, 95,000,000; size, 16 and 32x15x30; price, \$18,500; one of these machines, \$9,750. Proposition No. 8: Crank and fly-wheel vertical-beam engines; two machines; duty, 95,000,000; size, 19 and 38x18x30; price, \$25,000; one of these machines, \$13,000. The Gordon & Maxwell Co.'s propositions all include foundations and all piping inside engine-room.

E. P. Allis & Co., Milwaukee—Engine "A": Reynolds compound-condensing duplex-pumping engine; capacity, 5,000,000; duty, 95,000,000; piston speed, 100 feet; size, 30 and 56x22, 1—2x36; price, \$23,000; stone foundations extra, \$3,600; brick foundations, stone-capped, \$1,200. Engine "B": Reynolds compound-condensing pumping-engine; capacity, 5,000,000; duty, 95,000,000; piston speed, 150 feet; size, 20, 1—2 and 42x17x36; price, \$20,000; stone foundations extra, \$3,300; brick foundations, stone-capped, \$1,100.

G. F. Blake & Co., New York—Compound-condensing duplex machine; capacity, 5,000,000; duty, 60,000,000; size, 24 and 48x22x48, with foundations, \$25,000.

H. R. Worthington & Co., New York—Compound-condensing pumping-engine; capacity, 5,000,000; duty, 65,000,000, with cut-off attachment; size, 21 and 36, 3—8x21, 1—2x36, with foundations, \$16,750; same machine without cut-off, \$15,750.

Holly Manufacturing Co., Lockport, N. Y.—Gaskill compound pumping-engine; capacity, 5,000,000; duty, 100,000,000; size, 21 and 42x22, 1—2x36, with foundations, \$22,000; same size, non-compound, duty, 65,000,000, \$16,500.

Dean Steam-Pump Co., Holyoke, Mass.—Compound-condensing duplex machine; duty, 65,000,000; capacity, 5,000,000, with foundations and without connections; size, 22 and 40x22x36; price, \$15,850; same machine, with 24-inch stroke instead of 36-inch, \$13,500. If not desired disconnected, \$500 will be deducted.

Southwark Foundry and Machine Co., Philadelphia—Compound-condensing engine, to comply with specifications; size, 26 and 48x24x36, with foundations; price, \$15,500.

MENOMINEE, MICH.—H. F. Dunham, of the firm of Dunham & Paine, civil engineers, Cleveland, O., has the contract for constructing the water-works. The Lake Shore Iron Foundry, of Cleveland, has the contract for furnishing eight miles of pipe.

MILAN, O.—Water-works will, in all probability, be built here at an early day.

CLEVELAND, O.—A. F. & H. Strater, plumbers, have received the contract, at \$3,500, for the plumbing of the new Saving & Trust Company's bank on Euclid Avenue.

MINNEAPOLIS, MINN.—The Water-Board has awarded the contract for strengthening the roof of the east side pumping-station to E. R. Hamilton, at \$1,289.94. The Committee on Extensions was authorized to have tests made of the water in the river, near the mouth of Bassett's Creek and near the sewers, to report as early as possible.

NEWARK, N. J.—The Joint Board, of Newark and Jersey City, to prevent pollution of the Passaic and its tributaries, voted, November 21, to recommend to the Aqueduct Board of Newark and the Board of Public Works of Jersey City the consideration of the Hyatt filter for purifying the water-supply. Mr. J. W. Hyatt was before the board and stated that ten filters twenty feet in diameter, with the necessary buildings and apparatus, could be obtained for \$100,000.

GOVERNMENT WORK.

NEW YORK.—Synopsis of bids for furnishing 1,000 tons of coal for the Navy, opened by Pay-Director A. H. Gilman, U. S. Navy: Samuel G. French, \$3.79 per ton; H. E. Bowns, \$3.69 per ton; C. H. Bass, \$3.65 per ton; C. H. Raymond, \$3.58 per ton.

DELAWARE BREAKWATER.—Contract for furnishing stone was awarded to Charles A. Brown, of Elizabeth, N. J., at \$1.74 per ton. Bids were published in our issue of November 20.

DUNKIRK, N. Y.—Contract for dredging channel and repair of East breakwater has been awarded to Hingston & Woods, of Buffalo, N. Y. Bids were published in our issue of November 20.

DALLAS, TEX.—Synopsis of bids for stone and brick work of the basement and area walls of the court-house, etc.: M. D. Faulk, of Dallas, \$60,000; Brownless & Co., of Dallas, \$17,963.

ARKANSAS CITY, ARK.—Contract for repairing levees from Arkansas City to Amos Bayou, Ark., has been awarded to the Tennessee Industrial Company, of Memphis. Bid was published in our issue of November 20.

SUSQUEHANNA RIVER.—Synopsis of bids for dredging, received by Gen. William F. Smith, U. S. Agent:

American Dredging Co., Philadelphia, Pa., 14½c. per cubic yard measured in scows, and 19½c. measured in place.

Daniel Constantine, President Baltimore Dredging Co., Baltimore, Md., 17c. per cubic yard measured in place, and 12½c. measured in scows.

P. Sanford Ross, Jersey City, 16c. per cubic yard measured in scows, and 21c. measured in place.

James Caler & Son, Norfolk, Va., 16½c. per cubic yard measured in scows.

Frank C. Somers, Philadelphia, Pa., 13½c. per cubic yard measured in scows.

Morris & Cummings Dredging Co., New York, 19½c. per cubic yard measured in scows.

Contract awarded to the Baltimore Dredging Company.

JEFFERSON CITY, MO.—Synopsis of bids for stone and brick work for the court-house, etc.: J. M. Rice, Austin, Ill., \$16,985; J. McCarthy, Washington, D. C., \$13,670; J. H. McNamara, St. Louis, Mo., \$14,890.

NEWPORT, R. I.—The following bids for dredging in Wareham Harbor, and Wood's Holl Harbor, Mass., were received by Lieut.-Col. G. H. Elliot, U. S. Engineers, October 31. Prices are per cubic yard. Harbor of Refuge at Wood's Holl, Mass.—J. H. Fenner, Jersey City, N. J., 75c.; A. B. Martin, Boston, Mass., 75c.; Atlantic Dredging Co., Brooklyn, N. Y., 94c.; George E. Runyon, Boston, Mass., 97½c.; Thomas Symonds, Leominster, Mass., \$1.20 (or 70c. if contract for Wareham Harbor is awarded to him). Contract awarded to J. H. Fenner.

Wareham Harbor, Mass.—Atlantic Dredging Co., Brooklyn, N. Y., 16½c.; Richard M. Payne, Albany, N. Y., 16½c.; Elijah Brainard, New York, 17c.; George E. Runyon, Boston, Mass., 18½c.; J. H. Fenner, Jersey City, N. J., 20c.; A. B. Martin, Boston, Mass., 23c.; Thomas Symonds, Leominster, Mass., 32c. (or 23c. if contract for Wood's Holl Harbor of Refuge is awarded to him). Contract awarded to Atlantic Dredging Co.

The above awards were made in accordance with agreements between the tie bidders in each case.

ST. JEROME CREEK, MD.—Abstract of bids for dredging, opened November 20, 1884. Estimated quantity, 99,000 cubic yards: James Caler & Son, Norfolk, Va., 13c. per cubic yard;

National Dredging Co., Wilmington, Del., 21c.; Henry Birch, Washington, D. C., 30c.; Daniel Constantine, Baltimore, Md., 23c.; Morris & Cummings, New York City, 20c.; Richard M. Payne, Albany, N. Y., 22½c.; P. Sanford Ross, Jersey City, 24½c.

YORK RIVER, VA.—Abstract of bids for dredging, opened November 20, 1884. Estimated quantity, 180,000 cubic yards: Henry Birch, Washington, D. C., 35c. per cubic yard; Thomas P. Morgan, Washington, D. C., 8½c.; New York Steam Dredging Co., New York, 32c.; Daniel Constantine, Baltimore, Md., 12½c.; James Caler & Son, Norfolk, Va., 9½c.; National Dredging Co., Wilmington, Del., 30c.; George C. Fobes & Co., Baltimore, Md., 12½c.

BRETON BAY, LEONARDTOWN, MD.—Abstract of bids for dredging, opened November 20, 1884. Estimated quantity, 33,500 cubic yards: Thomas P. Morgan, Washington, D. C., 12c. per cubic yard; Henry Birch, Washington, D. C., 16c.; James Caler & Son, Norfolk, Va., 13½c.; National Dredging Co., Wilmington, Del., 13c.; Daniel Constantine, Baltimore, Md., 17c.; P. Sanford Ross, Jersey City, 16½c.

Gas and Electricity.

Illuminating Power of Gas in New York City.

Week ending	New York Gas-Light Company.	Manhattan Gas-Light Company.	Metropolitan Gas-Light Company.	Mutual Gas-Light Company.	Municipal Gas-Light Company.	Harlem Gas-Light Company.
November 22.	22.72	18.70	22.43	27.41	28.13	19.21

E. G. LOVE, Ph.D., Gas Examiner.

THE New Orleans *Evening Chronicle* relates that a Mexican officer stopping at a hotel in that city, in despair at the poor quality of the gas-light in his room, went out and bought a tallow-dip to give him light to read by.

THE Brush Electric-Light and Power Company, of New Orleans, has proposed to the city to erect and maintain eighty-three electric-lights of 2,000-candle-power each, to burn all night and every night for \$13,950 per annum. Six of these are to be a tower light, 150 feet high.

ATLANTA, GEO., has contracted for twenty electric-lamps for street lights. The contract runs for three months from December 1, and it is proposed to extend it and increase the number of lights if, during the three months, they are satisfactory.

A DESPATCH to the New York *Tribune* from New Orleans says: "The water-gas which was some months ago substituted for the old coal-gas, and from which so much was expected in the way of increased light and reduced bills, has proven a failure, and complaints by the public are many and loud. Lamps, and in many cases candles even, are preferred to it."

IN consequence of a cut in prices due to the rivalry between the Savannah, Geo., Gas-Light Company and the Mutual Gas-Light Company, gas is now sold in that city at \$1 per 1,000 cubic feet, and the warring companies threaten to send it lower. The president of the first named, in fact, says that "they will furnish gas as cheaply as any other company, and will do it if they have to give it away and throw in a chromo."

THE City Solicitor of Philadelphia has written an opinion holding that Councils may grant permission to the Economy Gas Company to construct works and lay pipes on the streets in the district known as Northern Liberties. In this district now operates the Northern Liberties Gas-Works, incorporated in 1834. The charter of the Economy Gas Company states that "the right to the franchises and privileges within the district covered by its charter shall be exclusive, and no other company shall be incorporated for that purpose until said corporation shall have from its earnings realized and divided among its stockholders during five years a dividend equal to 8 per centum per annum." The proper interpretation of this act, says the solicitor, and the rights of the respective companies are for the courts to determine. But whichever way decided the power of Councils to grant or withhold the permission asked is undoubted.

THE water-gas war has broken out in Cleveland between the existing company and the Forest City Lighting and Heating Company,

which proposes to supply water-gas. The war has now reached the stage where the papers of Cleveland are printing long articles on the dangers of water-gas, with lists of fatal cases, similar to the literature which abounded in Brooklyn a year or more ago.

THREE deaths, due to the criminal carelessness of a gas-fitter, were caused by gas-suffocation in Brooklyn, November 13. Mr. Louis Schiff, shoe-manufacturer, was fitting up a store on Broadway, in the Eastern District, and, with two of his employees, slept on the night in question in the place. They were all found dead the next morning, while the store was filled with gas escaping from the open end of gas-pipes in the show-windows on which the workman had forgotten to put caps.

PERSONAL.

CHARLES C. DEWSTOE, President of the Master Plumbers' Association of Cleveland, O., enters upon his duties as sheriff of Cuyahoga County in January. He was elected by a handsome majority.

THE MAGAZINES.

THE Christmas *Harper's* is one of the most richly-illustrated magazines which have ever come under our notice. Opening with the beautiful frontispiece, "The Boy Jesus in the Temple," engraved by W. B. Closson, from the painting by J. M. H. Hoffmann, of Dresden, the number has a profusion of full-page and smaller illustrations of uncommon beauty. Let the reader turn to the drawings accompanying Charles Dudley Warner's "Christmas Past," to the "Dear Long Ago," the "Flora," the "Winter in the Woods," and "A Snow-Squall" accompanying E. P. Roe's "Nature's Serial Story," the "Clouds Linger Yet," with Wordsworth's sonnet, and he has seen but a few of the many illustrations in this beautiful number.

In the *Century* of December is the second of the "war-papers," by General Lew Wallace, on "The Capture of Fort Donelson." So great was the interest in the first paper, by General Beauregard, on the first battle of Bull Run, that the large edition of 160,000 copies of the November number is exhausted. This second paper, written in easy and stirring style, has the interest of romance. A fine full-page head of General U. S. Grant is the frontispiece of the number. Colonel George E. Waring's papers on the "Principles and Practice of House-Draining" are concluded. Other principal articles: Mrs. Schuyler Van Rensselaer's, on "American Painters in Pastel"; Mark Twain's humorous sketch, "An Adventure of Huckleberry Finn," Tom Sawyer's Comrade; Emma Lazarus' article on Heine, with translations; Warren Lee Goss' second paper on the "Recollections of a Private"; John Burroughs' "Winter Neighbors," and Edward Dowden's "Dublin City."

Building Intelligence.

We solicit from each and every one of our readers information relating to projected buildings in their locality, and should be glad to receive newspaper clippings and other items of interest.

ABBREVIATIONS.—*b s*, brown stone; *br*, brick; *br st*, brick store; *b s dwell*, brown-stone dwelling; *apart house*, apartment-house; *ten*, tenements; *ea*, each; *o*, owner; *a*, architect; *b*, builder; *fr*, frame.

NEW YORK CITY.

38 E Broadway, 5-story br ten; cost, \$14,000; o, Esther Simon; a, Wm. Graul.
126-28 W 35th st, 2 5-story br flats; cost, \$40,000; o, A. M. Hegeman; a, Daniel Burgess; b, D. and E. Herbert.
42d st, n s, 370 e Vanderbilt av, br and iron passenger railroad depot; cost, \$200,000; o, N. Y. & H. R. R. Co.; a, Wm. Lush.
539-41 W 56th st, 4-story br factory; cost, \$30,000; o, H. H. Hollis; b, Stephen H. Mapes.
328 E 77th st, 5-story br and stone ten; cost, \$14,000; o, Mrs. Gertrude Sossau; a, Ernst W. Greis.
Madison av, s e cor 105th st, 6 3-story br dwells; cost, ea \$7,000; o and b, Nicholas McCord; a, Renwick, Aspinwall & Russell.
75th st, s s, 200 w of Boulevard, 5 3-story b s dwells; cost, ea \$12,000; o, Daniel L. Brandt; a and b, Wm. J. Merritt.
75th st, n s, 200 w of Boulevard, 4 5-story br flats; cost, ea \$20,000; o, a and b, same as last.
St. Nicholas av, n e cor 154th st, 4 2-story and attic br dwells; cost, ea \$12,000; o, Harkness Boyd.
130th st, s s, 125 w 7th av, 2 4-story br dwells; cost, ea \$12,000; o, Hannah M. Halpin; a and b, Wm. J. Merritt.
129th st, s s, 100 e 8th av, 5-story b s front ten; cost, —; o, John H. Provost; a, Andrew Spence.

ALTERATIONS, NEW YORK.

436-38 E 56th st, repair damage by fire; cost, \$6,000; o, Peter Doelger; a, Fred Bernhardt; b, M. Schmeckenbecker's Sons.

52-54 New st, raise front, etc.; cost, \$10,000; lessee, John E. Wylie; a, Babcock & McAvoy; b, not selected.
319 W 14th st, fit up for flats; cost, \$5,000; o, Henry B. Havemeyer; a, John Sexton; b, E. H. Miller.
112 E 16th st, extension; cost, \$5,000; o, Auguste Lewis; a, Vaux & Radford; b, D. C. Weeks & Son and Henry Ellis.

BROOKLYN.

Marcy av, e s, 25 n Heyward st, 5 2-story b s dwells; cost, ea \$5,000; o, John H. Shultz; b, W. & T. Lamb and Jenkins & Gillies.
Marcy av, n e cor Heyward st, 3-story b s st and dwell; cost, \$8,000; o, etc., same as last.
Rockaway av, s e cor Hull st, 3-story br st and dwell and 4 2-story and bmt br dwells; cost, ea, \$3,000; o, Cozens & Barton; b, L. E. Brown.
South 1st st, n e cor 8th st, 4-story br ten; cost, \$11,000; o, Mrs. John Baldwin; a, E. F. Gaylor; m, Jacob Bisson; carp, not selected.
Chauncey st, n s, 525 e Stuyvesant av, 3 2-story and bmt br dwell; cost, ea, \$3,000; o, Daniel Lauer; a, Amzi Hill; b, Weeks & Lauer.
Marion st, n s, 150 e Reid av, 3 3-story br dwells; cost, ea, \$3,000; o, Mrs. E. Sullivan; a, M. Walsh; b, Philip Sullivan.
Gates av, n s, 200 w Tompkins av, 5 4-story br store and flats; cost, ea, \$10,000; o, W. H. Aldridge; a, Robert Dixon; b, James Burns.

DETROIT, MICH.—Architects Julius Hess & Co. have prepared plans for a \$10,000 residence for James Walker.

P. McDonald will begin the erection of a dwelling after plans by A. C. Varney, to cost \$8,000.
Architect French has completed plans for a \$5,000 brick dwelling for Mrs. H. M. Smith.

CLEVELAND, O.—Cor Willson and Curtis avs, br riding school bldg; cost, \$7,500; o, Cleveland riding school; b, Thos. Simmons.

SYRACUSE, N. Y.—Cazenovia st, fr summer dwell; cost, \$6,200; o, Dr. Emory; a, Silsbee & Hall; b, Hunt & O'Brien and P. Neylon.

PHILADELPHIA, PA.—Dauphin st, bet Broad and 15th, 5 br and b s dwells; b, C. C. Moore.

Lawrence st, n Somerset, 2 br dwells; o, John Mitchell.

Cor Cambria and Leithgow sts, 5 2-story dwells; o, John I. McDuffee.

Woodland av, bet Walnut and Chestnut, 2 3-story dwells; b, R. H. Somerset.

McClellan st, bet 11th and 12th, br dwell; o, Chas. McCartney.

S e cor Manayunk av and Woodvale sts, 2 3-story br dwells; b, Chas. E. Bartle.

Titan st, bet 20th and Long lane, 9 br dwells; b, R. Coulomb.

A new st, bet McClellan and Carpenter st, 20 br dwells; b, Townson Bros.

IROQUOIS, ONT.—Stone dwell; cost, \$5,000; o, M. F. Beach; a, Johnston & Buell; b, not selected.

TOLEDO, O.—Architect A. Liebold has completed plans for dwellings for the following persons: L. Kraus, \$7,000; William Tait, \$8,000; M. Woodbury, \$11,000; John Weed, \$4,000.

KALAMAZOO, MICH.—E. O. Fallis & Co. are the architects of the new court-house, to cost \$60,000.

DUBUQUE, IA.—100 W 3d st, br dwell; cost, \$6,000; o, Mr. Dougherty; a, C. A. Wilber; b, John McCoy.

300 W 14th st, improvements to St. Joseph's College; cost, \$10,000; o, Rt. Reverend John Hennessey, Bishop of Dubuque; a, J. D. Hyde; b, J. McQuillan.
100 W 4th st, steam-elevator; cost, \$5,000; o, Fourth Street Elevator Co.

ST. LOUIS, MO.—Lafayette and Michigan sts, 2-story dwell; cost, \$10,000; o, J. G. Zimmerer, a, A. Beinke & Co.; b, W. G. Popp.

Palm and Knapp sts, 2 adjoining dwells; cost, \$7,500; o, F. Tiemann; a, A. Beinke & Co.; b, Shildemann & Grosse.

22d and Wright sts, double dwell; cost, \$11,000; o, J. Guhianon; a, J. S. Taylor; b, J. H. Keefe.

7th st and Christy av, 6-story business bldg; cost, \$18,000; o, P. Burns; a, Thomas Furlong.

Channing and Franklin sts, 2-story car-stable; cost, \$20,000; o, St. Louis Cable & Western R. R. Co.

Delmar & Narrow Gauge R. R., 3-story dwell; cost, \$2,200; o, G. C. Williams; a, G. I. Barnett & Co.; b, F. Bechner.

9th and Utah sts, 1-story church; cost, \$27,000; o, St. Agatha Church; a, C. Druding; b, Jas. Stander.

DETROIT, MICH.—102 8th st, br dwell; cost, \$12,000; o, Schmitt & Schmitt; a, H. Engelbert; b, Spitzley Bros.

556 2d st, br dwell; cost, \$11,000; o, T. R. Dudley; a, M. L. Smith; b, W. H. Traves.

C. Byram, P. Dederichs, and W. Scott & Co. have plans for buildings valued at from \$5,000 to \$6,430.

WARE, MASS.—10 fr tens for operatives; cost, ea, about \$1,500; The E. H. Gilbert Mfg. Co.; o, E. C. Gardner.

PALMER, MASS.—Main st, alteration of store; cost, \$6,000; o, Caryl Bros.; a, G. E. Potter.

Main st, fr dwell; cost, \$6,000; o, C. A. Brown; a, G. E. Potter; b, W. Madison.

CHICAGO, ILL.—182-200 Colorado st, 8 br cottages; cost, \$11,000; o, a, and b, W. J. Anderson.

Colorado av, 12 br cottages; cost, \$21,700; o, S. E. Gross.

Grove Terrace, 10 br cottages; cost, \$18,000; o, S. E. Gross.

2052 Michigan av, br dwell; cost, \$10,000; o, J. Hervey; a, Treat & Foltz.

3,817-19 Ellis av, br dwell; cost, \$10,000; o, Mrs. U. Clark; b, Fowler & Carr.

750-69 Van Buren st, br st and dwell; cost, \$25,000; o, J. W. Carpenter; a, Burnham & Root.

104-200 Johnson st, br school-house; cost, \$11,000; o, Chicago; a, J. J. Flanders; b, L. J. Doegling.

Furst & Rudolph, F. Woescher, F. C. Charnley, A. Boss, and Thomas & Pulman are architects for buildings valued at from \$5,000 to \$7,500.

GRAND RAPIDS, MICH.—Architect E. E. Myers, of Detroit, has completed plans for a city hall, to cost \$150,000.

New Advertisements.

B. P. BOWER & CO., Cleveland, O. Sewer-Gas Trap. P. 594.

J. L. MOTT IRON WORKS, New York. Sanitary Specialties. P. 595.

THE MEYER-SNIFFEN CO., Limited, New York, Boston, and Chicago. Sanitary Specialties. P. 597.

PROPOSALS. P. 598.

EDWIN A. JACKSON & BRO., New York. The Jackson Ventilating-Grate. P. 611.

EMPLOYMENT WANTED. P. 611.

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A. HOLT & CO., Boston, Mass. Steam and Hot-Water Boiler. P. 612.

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C. E. ASHCROFT, Boston, Mass. Steam-Heating. P. 612.

STAMBACH & LOVE, Philadelphia, Pa. Plumbers' Supplies and Sanitary Specialties. P. 612.

EUROPEAN ADVERTISEMENTS. Pp. 612-613.

THOMAS MADDOCK & SONS, New York, and Trenton, N. J. Smith Syphon-Jet Water-Closet. P. 614.

ASBESTOS PACKING CO., Boston and New York. P. 615.

MYERS' SANITARY DEPOT, New York. Plumbers' Supplies and Sanitary Specialties. P. 615.

BOOK DEPARTMENT, THE SANITARY ENGINEER. P. 616.

ANNOUNCEMENT

The publication of the sixth revised edition of the U. S. Pharmacopoeia (1880), containing as it does much more strict requirements for the purity and strength of pharmaceutical preparations, has been followed in some States of the Union by the enactment of laws against the adulteration of drugs, which laws make the Pharmacopoeia the official standard.

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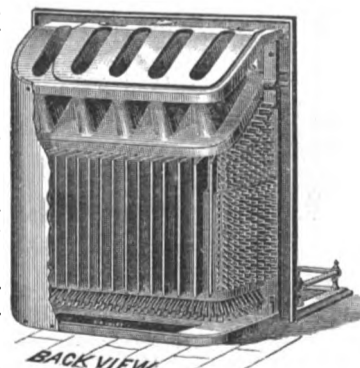
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Index to European Advertisements.

CRAIG, J. & M., Kilmarnock (near Glasgow), Scotland. Grease-Traps. P. 613.
CAPPER, SON & CO., London, Eng. The "Twin-Basin" Water Closet. P. 613.
DOULTON & CO., London, Eng. Sanitary Specialties. P. 613.
HARTSHILL BRICK AND TILE CO., Stokes-on-Trent, Eng. Tiles. P. 613.
HOUGHTON & CO., London, Eng. Sanitary Specialties. P. 613.
HYGIENIC AND SANITARY ENGINEERING CO. (LIM.), London, Eng. Sanitary Specialties. P. 612.
JOHNS, EDWARD, Rugeley, Eng. Plumbers' Earthenware. P. 613.
KEITH, JAS., London, Eng., and Edinburgh, Scotland. Heating and Ventilating. P. 613.
KING, P. S., & SON, London, Eng. Publishers and Booksellers. P. 613.
LIEBIG CO. Extract of Meat. P. 613.
POPPLEWELL, COLTON & CO., London, Eng. Patent Agents and Consulting Engineers. P. 613.
SMALPAGE & SON, London, Eng. Tailors. P. 613.
THE LAMHAM HOTEL, London, Eng. P. 613.
THE NORTH BRITISH RUBBER CO. (LIM.), Edinburgh, Scotland. Rubber for Sanitary Purposes. P. 613.
WOODWARD, JAS. Swadlincote near Burton-on-Trent, England. Sanitary Specialties. P. 613.

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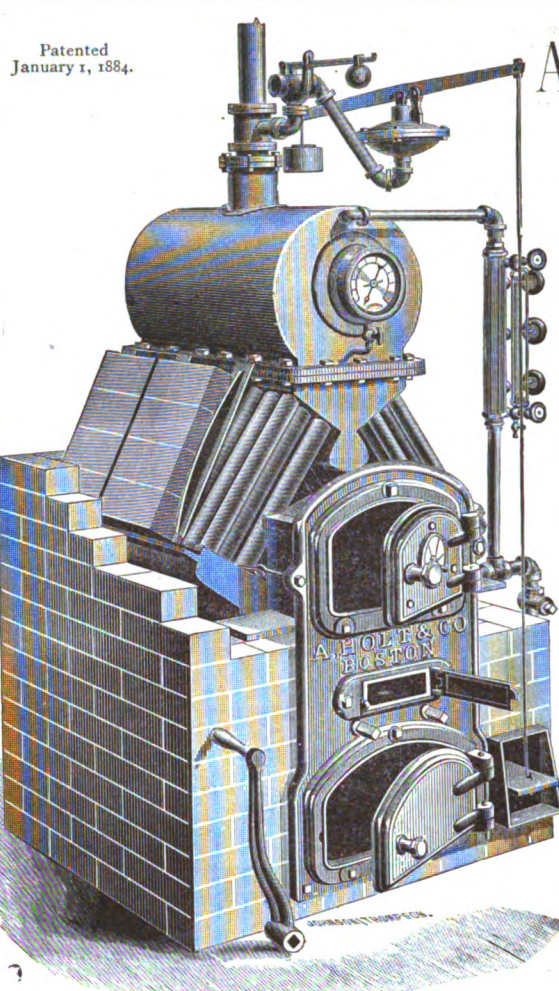
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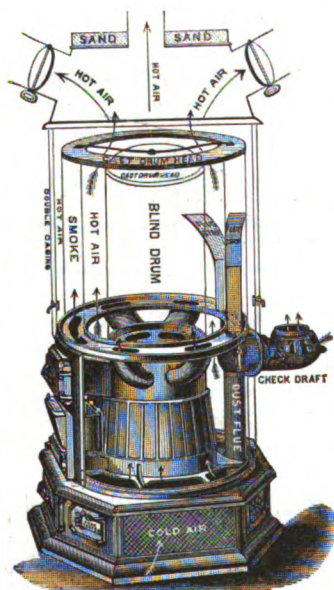
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high and even temperature of which is continuously maintained, giving
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Correspondence solicited and carefully answered. Descriptive
Pamphlets sent on application.

MANUFACTURERS:

ABRAM COX STOVE CO., PHILADELPHIA.

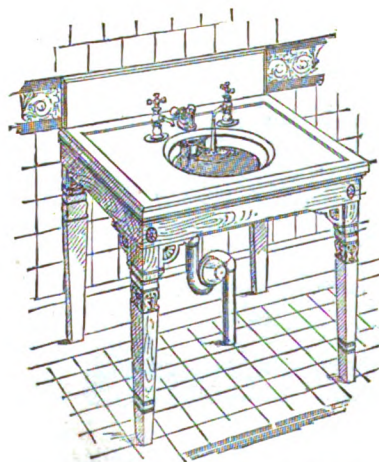
The "Sanitas" Patent Plumbing Appliances.

THE
"SANITAS"
("Anti-Siphon") TRAP,
WASH-BASIN,
SEWER-PIPE,
NOW READY.

These are the appliances described and
recommended in the *American Archi-
tect and Building News* for 1883-1884,
in the articles on "Sanitary Plumbing."

The Trap is the only self-scouring water-seal trap
which retains its seal even unventilated, against Siphon-
age, Back-Pressure, Evaporation, and all other enemies
of the seal of traps.

The Sewer and Soil Pipe is jointed with the "Ad-
justable Flange Joint," described in the *American
Architect*. It is made of the best heavy cast-iron and
is permanently water, gas, and steam tight under pres-
sure. The Wash-Basin is quick emptying, and is the
simplest and most perfect wash-basin in the market.

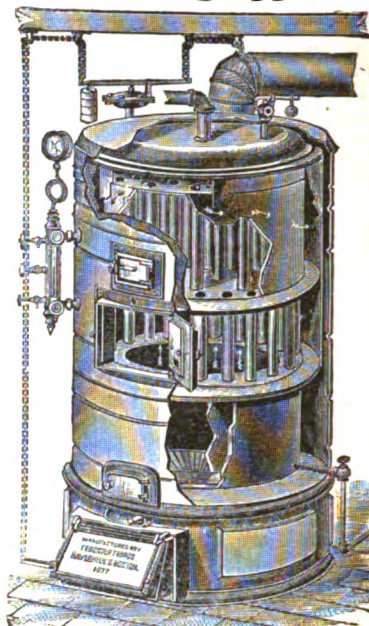


THE "SANITAS" WASH-BASIN.
WITH "SANITAS" TRAP ON WASTE-PIPE.

FOR SALE BY ALL DEALERS IN PLUMBERS' SUPPLIES.

THE SANITAS MFG. CO., 9 PEMBERTON SQUARE, BOSTON.

LE BOSQUET'S
Steam-Heating Apparatus.



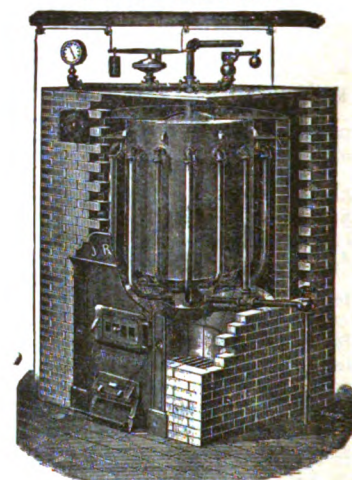
TEN SIZES FOR MASONRY. TEN SIZES PORTABLE.

Send for Descriptive Pamphlet.

LE BOSQUET BROS.,
75 UNION STREET, BOSTON.

THE ECONOMICAL
Steam-Heating Apparatus.

Patented December 6, 1881.



IN USE FOUR YEARS.

Full particulars and testimonials forwarded upon ap-
plication.

C. E. ASHCROFT,

91 OLIVER STREET, BOSTON.

European Advs.

GOLD, SILVER, AND BRONZE MEDALS.
LATEST AWARD,
GOLD MEDAL AT NICE, MAY, 1884.

THE HYGIENIC AND SANITARY ENGINEER-
ING CO. (LIMITED), 23 and 24, Charing Cross,
London, have purchased the Patent Rights and Busi-
ness of MR. DANIEL T. BOSTEL, of Brighton and Lon-
don, including BOSTEL'S "EXCELSIOR" WATER
CLOSET. With the facilities at their command they
can promptly supply the Trade with the various BOS-
TEL SANITARY APPLIANCES, and the following
American specialties:

THE FULLER FAUCETS, THE DOHERTY
SELF-CLOSING COCKS, AND THE TUCKER
GREASE-TRAPS.

The Company, having secured the services of Mr.
Bostel as Managing Director, undertake the sanitary
inspection of premises, and with their own skilled arti-
sans execute any work in connection with the drainage
and water-supply of buildings.

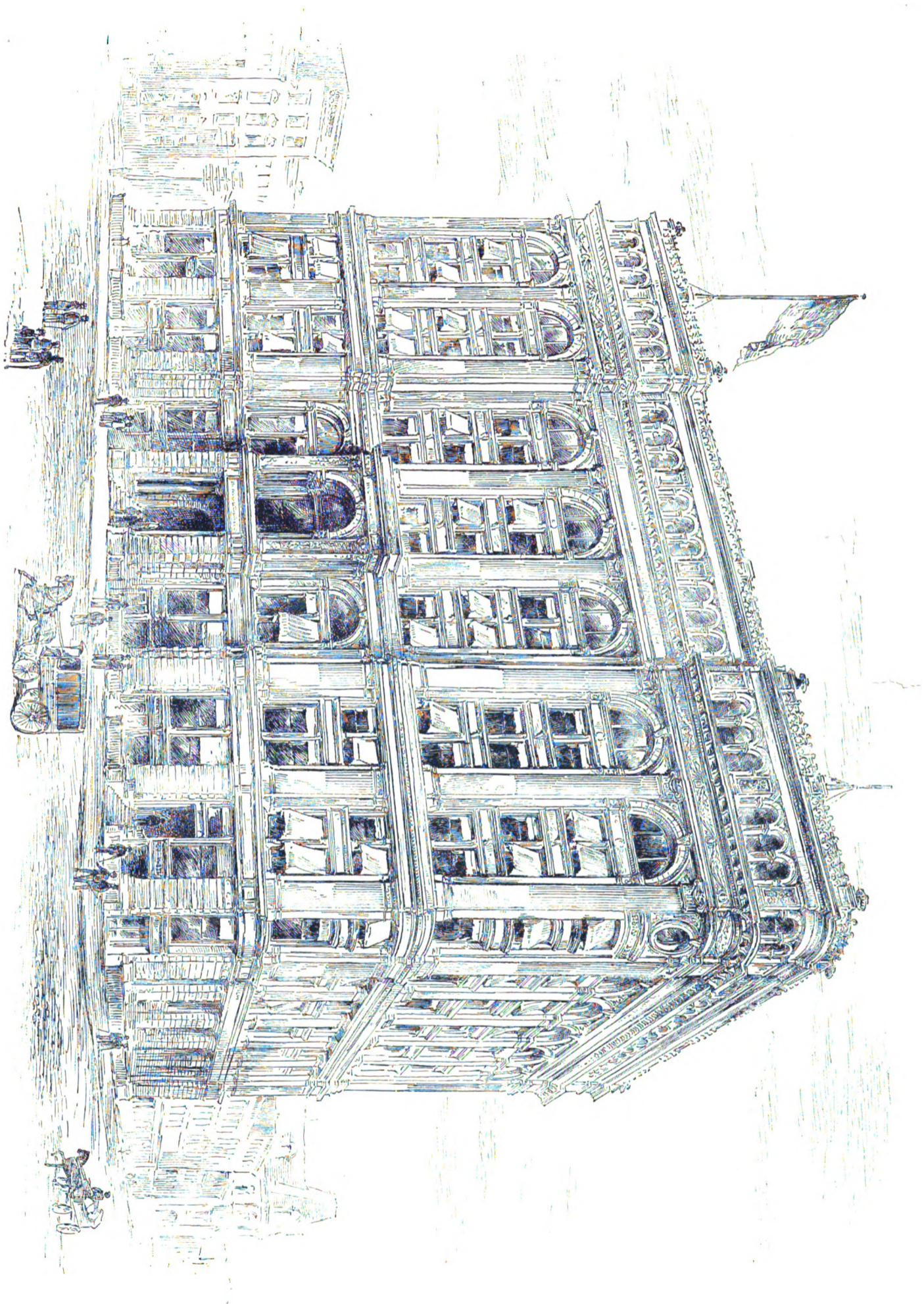
Inspections and work are under the personal super-
vision of Mr. Bostel, whose 25 years' practical experience
is a guarantee that these important matters will be in-
telligently and faithfully attended to.

LONDON, October, 1883.

ILLUSTRATED PRICE-LISTS SENT ON
APPLICATION.

EXHIBIT:

International Health Exhibition, Class 23-508.



THE SANITARY ENGINEER SUPPLEMENT.


THE MUTUAL LIFE INSURANCE COMPANY BUILDING.

CHARLES W. CLINTON, ARCHITECT, N. Y.



UNIVERSITY OF MINNESOTA
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